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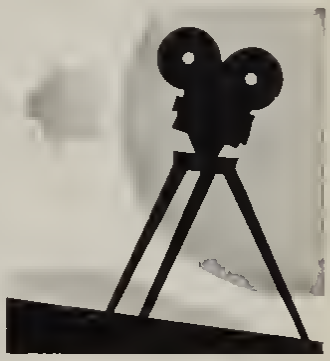

What to Read

Next Month

● Philip M Chancellor, A S C, will continue his interesting description of color in still photography This month he delved into the theory of this interesting phase of photography Next month he will tell you more about the practical things of this interesting art

● More about lighting, but this time about the use of arc lights in black and white photography as it was employed in one of the big coming productions An A S C man will give you the insides of this interesting story

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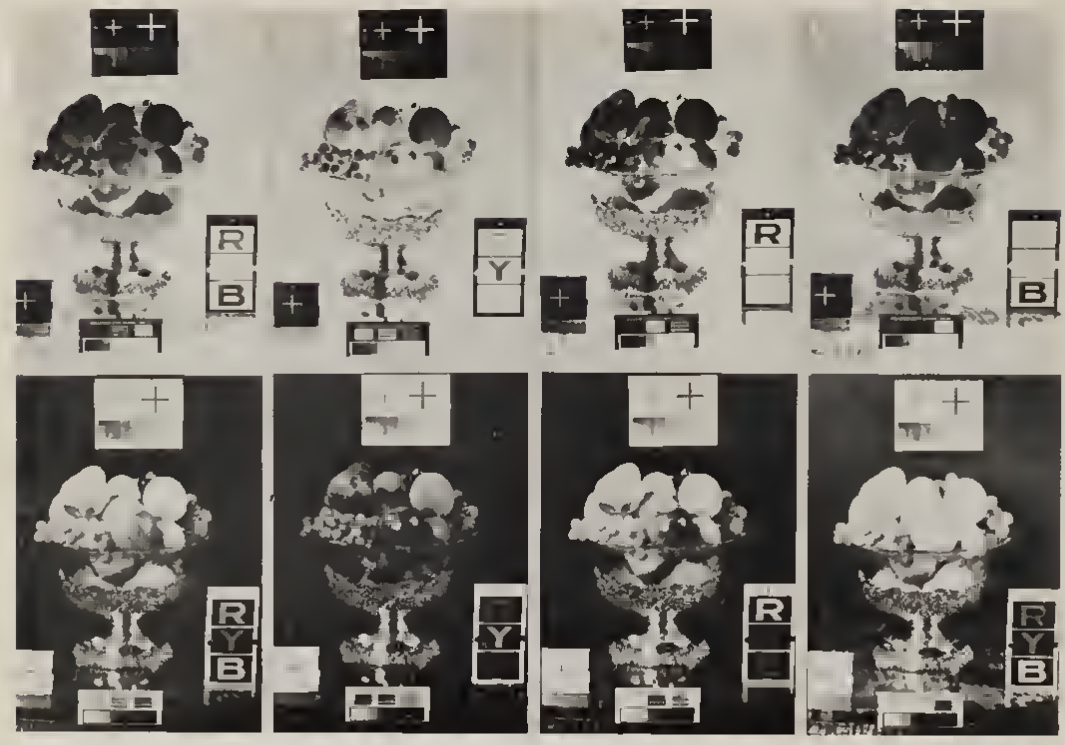

Color-separation negatives and prints. Reading from left, normal black-and-white rendering (K-3 correction), yellow printer, made with blue filter; red printer, made with green filter; blue printer, made with red filter. In color guide at lower right of picture, "R" is green, "Y" is violet, and "B" is red

"Still" Photography in Natural Colors

by
Philip M. Chancellor, A.S.C., F.R.G.S.

COLOR photography has definitely assumed a most important place in the commercial fields of advertising and illustrating, even to the extent of crowding paintings, drawings and black-and-white photographs in the pages of our national magazines. It is making worthwhile strides in motion picture production, and indeed has reached a fine state of development in certain recent releases.

With an increasing number of all-color features scheduled for production during the coming season, the question naturally arises, "Since natural-color photography is so successfully used in our magazines, can it not also be used to give us natural-color stills for our Technicolor releases?"

The best answer to this question is a careful review of the principal methods of natural-color photography in general use today, and their adaptibility to the problems of the studio still man. But before starting on such a review, it behooves us to have at least a rudimentary knowledge of the principles underlying these processes. Therefore, at the risk of repeating facts with which the reader may already be familiar, I shall give a brief description of color in its physical aspect, as light.

When sunlight is passed through a glass prism, it becomes decomposed into a series of separate colors known as "Spectrum Colors." Actually, spectral colors are innumerable, and range from the (invisible) Infra-reds through all the visible shades to the invisible Ultra-violets. By means of a slit, the solar spectrum may be divided into a series of distinct lines of color, known as the Frauenhofer lines. The most distinct of these lines are designated by letters, and serve as a means of identifying the position of certain colors in the spectrum.

Figure 1 shows the position of the most important lines in relation to the spectral colors, while the numbered lines indicate their wave-lengths in terms of Angstrom Units.

If by optical means the independent colors of the spectrum are superimposed upon each other, the result will be white light. Thus we may conclude that white light is the combination of all the colors in the visible spectrum, and hence it is termed Polychromatic light. In contradistinction to polychromatic light, we find that by superimposing only selected parts of the spectral light, colored light-

mixtures of o uniform tint moy be obtoined, ond this is termed Monochromotic light Thus we differentiote between light of one selected wove-length, ond light of mixed wove-length By suitable choice of two spectrol colors only, white light may be re-composed Such spectrol colors are colled Complementory Such complementory color-combinotions ore

Red ond Blue-green
Orange ond Greenish-blue
Yellow ond Blue
Greenish-yellow ond Violet

To oppreciate the sensotion of color os produced upon the humon eye, we must regord the Young-Helmholtz theory of color vision This theory, originally odvonced by Young in 1807, wos later occepted by Helmholtz ond Moxwell, ond is still favored by the mojority of physicists

This theory ossumes the presence of three light-sensitive nerve-fibrils in the humon eye, which serve os o meons of tronsmitting to the broin the three primory color-sensotions When excited, one conveys to the broin the color-sensotion of red, the second, thot of green, ond the third, thot of violet If all three fibrils ore excited simultoneously ond with equol intensity, they convey the sensotion of white When ot rest, they convey the sensotion of block Unequol excitement conveys intermediote tones of color, in proportion to the omount of primory color-vibrotion

Young selected for his originol experiments the fundomentol colors of red, green ond violet Loter experiments, however, have shown thot it would be impossible to mix oll the spectrol colors in scientificolly full purity, using only the three primories, but for procticol purposes, the three primories ore sufficient, os the overoge eye connot judge color with sufficient occurocy to detect these more minute inoccurocies of shoding

Beoring in mind the foregoing principles, we now foce the procticol opplicotion of our knowledge This we moy divide into two sections First, the onolysis of the colors, ond their seporotion through the use of filters—thot is, moking the negotive or negotives, Second, the resynthesis of the colors to form o colored photogroph—thot is, moking the positives or prints

The problem of the seporotion of the colors moy be considered os solved, the color-sensitivity of modern photographic emulsions ond the color-obsorption of filters gives the photographer olmost perfect control of this phose, though mechonicol ond optical foctors render the motter of comero design ond monipulotion complicoted ond expensive

The second—ond by for the greotest—problem lies in moking the positive print Even in mogozine-printing, the problem of producing o printing plote or plotes, ond the exoct mixing of inks to restore color to the imoge, is far from its ideol solution in spite of the greot progress thot hos lotely been mode Producing our color-picture on poper, without recourse to photoengroving ond mechonicol printing, os will be necessory in studio work, is on even greoter problem While color-prints, mode photographicolly upon poper, ore not impossible, their production os yet is o slow, intricote ond expensive process in no way comporoble with commerciol block-ond-white printing methods

The reosons for this ore obvious when we review the steps involved in producing o photogroph in notural colors In the first ploce, we must breok down the imoge into its three complementory-color components Disregording the screen-plote processes, which produce only tronsporencies, the most proctical meons of doing this is by making o set of three complementory negotives The densities of the three negotives represent the omount of Red, Green ond Blue light reflected from the object photogrophed This much is relotively eosy, due to the control possible by using

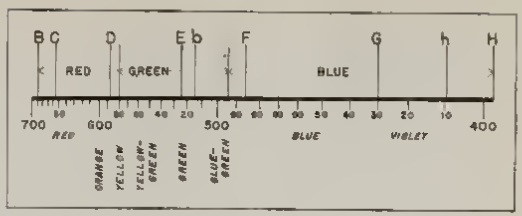

Fig 1

color-filters of the proper obsorption characteristics Tronsporencies mode from these three negotives, each illuminated by light of the appropriote primary color, should when superimposed, give o picture of the object in its originol colors This ot leost is the hoppy theoreticol ossumption, in proctice, unforeseen difficulties ore encountered Theoreticolly, the projection filters should be the some as the toking filters, when superimposed equolly, the colored beoms projected through these filters should form white Actually, this ideol condition is not fulfilled by the toking filters so in practice onother set of filters must be used for projection to recreate the colors of the originol

Actually moking our three color-seporotion negotives, we begin with three ponchromatic plotes or films, ond expose them through the Wrotten set of tri-color filters These filters, the "A" No 25 (red), "B" No 58 (green) ond "C-5" (blue-violet), ore chorocterized by even transmission, and end os obruptly os possible The blue-violet and green overlap from wove-length 480 to 520, ond the green ond red from 580 to 600 Since their respective factors ore different (respectively 4, 8, ond 6 on Super-Sensitive in doylight), the three exposures must be compensoted so os to produce on overoll correct exposure

Considering, for the soke of simplicity, only one of the three seporotion-negotives, we con eosily see that, for example, the red-sensotion negotive will record the omount of red in the subject in terms of greoter or lesser density occording to the proportion of red reflected from ony given oreo A positive plote made from this negotive will represent purest red by meons of its cleorest portion—that is to soy, where the red hos been most freely transmitted by the filter—and those ports containing less red by an increose of density in the plote Where no red exists, the plote will be opoque If the plote is held before o red light, it would reproduce the red-component sensotion in the originol In the some woy, the other two plotes will reoct similorly, and reproduce their respective co'or-sensotions

Were these three plotes ploced in o suitoble viewing instrument, together with their respective filters, ond viewed (by projection or otherwise) occurotely superimposed, the originol imoge, in oll its colors, would be reconstructed In this instance, it will be noticed thot "colored light is odded to colored light" By superimposition of light tinted by the primary filters, on imoge is produced This is known os the ADDITIVE process

To recombine these colors on pooer, os in o photogrophic or mechonicol printing orocess, it becomes necessary to superimpose the colors uoon eoch other on poper The white poper upon which we ploce the three imoges will reflect oll three primory colors. Now, controry to the Additive method of superimposition just outlined, we must in this cose print from the thinner ports of the plote, or those ports which reoresent on obsence ot color in the seporotion-imoge

Therefore, our Red must not be printed in red ink, but rother with o "Minus-red" ink, or o color which completely obsorbs red In oddition, the color to be represented

(Continued on Page 434)

Summing Up

18 Sun Spot

24' Sun Spot

Lupe Light

TODAY'S trend among Hollywood's outstanding exponents of cinematographic lighting is toward the use of fewer light-sources and more actual lighting effects. Comparing the average set of today's productions with one even so recent as five years ago, one cannot fail to be impressed with this fact: fewer general lighting units are to be seen on the floor, fewer spotlight units are in use along the spot-rails, and overhead 'dome' and 'strip' units are seldom used. Moreover, the units now available are smaller, and of considerably greater efficiency than their predecessors. A particularly striking example of this is the recently introduced Mole-Richardson 'Junior Solarspot", which appears almost dwarfed in comparison with the 18-inch Sunspot which it is rapidly supplanting. And not only do modern units utilize a greater percentage of the light radiated by their light-sources, but they distribute it more uniformly within the projected beam, so that subsidiary lamps are no longer needed to minimize the effects of uneven beam-distribution.

In general, the incandescent-filament globe is still by a considerable margin the most popular light-source, but the carbon arc, in its modern forms, is regaining more and more of the ground lost during the almost simultaneous introduction of Panchromatic film and talking pictures. In the field of natural-color cinematography, of course, the arc is supreme due to its more perfect approximation of the color of natural sunlight, and to its higher unit intensity.

It is customary to divide lighting equipment into the two broad groups of "general" and "modelling" lighting units, but it would seem more accurate to re-classify them today as "floodlighting" and "spotlighting" (or "projecting") units, and to add a third category to include the various special-purpose lamps developed in recent years.

Under the head of "floodlighting" equipment, we may list those units used to provide a uniform light-flux, of moderate intensity, over a wide angle, and used either on the stage floor or overhead. In the incandescent range, these units are represented principally by the "Rifle" lamp, which has almost completely superseded the early incandescent broadside, and by the absolescent five-globe "bank" and overhead strip units. In the arc range, we find the modernized twin-arc broadside for floor use, and its companion, the overhead "scoop". The mercury-vapor "banks", once so generally used for this purpose, have vanished.

The standard incandescent floodlight unit is the Mole-Richardson Type 45 "Rifle", using a single 1,000 or 1,500 Watt P. S. 52 mogul-based Mazda globe. By means of a rifle-corrugated, chromium plated metal reflector, the light is very evenly distributed over an angle of 60°. The lamp housing is an ellipsoidal duralumin spinning, corrugated for greater rigidity, and fitted with a globe-focusing adjustment at the rear, and with a built-in control switch. The lamp is supported upon a Y-shaped yoke, by which it may be mounted upon any of the standardized, tubular steel elevating pedestals made by the firm.

The corresponding arc unit is the same firm's Type 29 twin-arc broadside. This unit was developed especially for use in natural-color cinematography, and employs as its light-source a special 8mm carbon developed for the purpose by the National Carbon Company. A separate mech-

Modern Studio Lighting Equipment

by
William Stull, A.S.C.

cnism is used to feed each of its two orcs, resulting in more uniform light-flux ond silent operotion The rectongulor reflectar distributes the light uniformly over the required 60° angle, ond o pivoted stub is ploced directly below the lomp so thot it may be mounted on the standord pedestol The unit is made for operotion on Direct Current only (115-120 volts), and when burned ot 40-50 Amperes, produces an intensity of 220-foot-candles ot 15 feet—more thon 250% more thon its pretolkie forebeors The M-R Type 27 "Scoop" is essentiolly the same unit, with reflectar ond mounting designed to permit its use os on overheod floodlighting unit

Equipments of the spotlighting group ore ot present in o transitionol stage new and improved types ore being introduced, ond ore supplonting the older units os ropidly as studio procurement programs permit Mony of these newer units, in addition to their impraved performance, embody fundomentol engineering advonces in their opplicotion of principles not hitherto employed in motion picture lighting It follows, noturolly, that the units they replace are technically outmoded For the sake of completeness, however, it will be well to mentian these older, standard types as well os the newer designs

The fundamental spotlighting unit in the incandescent ronge is the 2,000 Watt, 18-inch Sunspot, or reflecting spotlight, currently represented by the Male-Richordson Type 220 This unit is used for general lighting of sets, for bock ond cross lighting to moke bath octors ond properties stond out fram the background, ond for some types of effect-lighting It may, in fact, be colled the lomp-of-all-work on Americon sets, as it is used both an the floor ond on the overheod lompgrid, and for olmost every purpose The lomp is built around o 2,000 Watt, 948-613 Mozdo globe, either the mogul-bosed or the bipost type of globe moy be used, but the lotter is becaming the more popular style The light-beom is formed by o porobolic mirror generolly o Bausch & Lomb gloss mirror is used, though in some studios foceted chromium-ploted metal mirrors ore preferred "Spill-rings", to obsorb oll the nonporollel roys from the forward side of the globe, ore universolly used In the eorlier designs of this class, the pretolkie proctice of moking the lomp-housing of sheet metol wos followed, ond no little trouble wos experienced with the noises due to uneven expansion of the ports in the heot of the lomp In the most modern Mole-Richardson types, the housing is o borrel-shoped costing of oluminum ollay, and the removable back dome, which holds the reflector, is o heavy stamping, ribbed for stiffness All auxiliory ports ore fitted in such o way os to hove unrestricted (ond therefore silent) expansian The switch and focusing control are built into the bottom of the lomp-housing The useful ronge of beom-divergences of this lomp is fram 8° to opproximotely 24°

Where higher intensities are required—os in back ond cross lighting on large sets, front-lighting in extremely deep ones, in special situotions where o lorge amount of light must be supplied by relotively few units, and for high-intensity effect lighting—the 24-inch Sunspot (M-R Type 226) is used This is essentiolly similor to the 18-inch unit just described, but built oraund the 5,000 Watt G64-C13 bi-post type Mozdo globe, and utilizing o 24-inch Bausch & Lamb gloss mirror ond spill-rings On rare occosions, o 10,000 Watt (10-KW), 36-inch unit is olso used

(Continued on Page 435)

Rifle

Baby Spot

Junior Solar Spot

200-Watt Spot Light

Mechanographic

Fig. 5 Mechanographic sound track showing resolution at 50,000 cps, at a recording level 55 db below maximum.

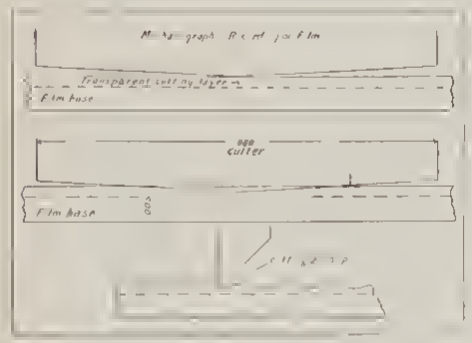

Fig. 1, bottom, the cutting tool used in the mechanographic system

FROM time to time there have been presented to the Society papers dealing with the methods and problems in connection with recording sound for motion picture accompaniment. In the beginning these papers had to do with recording on wax and of late with the photographic processes of recording on film. There is still a third method which has not yet been described before this Society and which is destined to play an important role. The introduction of this method is the reason for this paper.

The four present-day commercial methods may be defined as follows:

MECHANICAL—Wherein the recording and reproducing are done mechanically.

PHOTOGRAPHIC—Wherein the recording is done photographically and the reproducing is done optically.

MECHANOGRAPHIC—Wherein the recording is done mechanically and the reproducing is done optically.

MAGNETIC—Wherein the recording and reproducing are both done magnetically.

As far as motion picture recording is concerned, the mechanical (or disk) system has been eliminated and the telegraphone is not adaptable, so we can consider principally the other two systems, the photographic and mechanographic. Under the heading of photographic we must include the variable-density and the variable-width systems of recording, in considering the limitations of each. All

With variable-density film recording, the limiting factors are numerous, such as lens dispersion, width of recording slit, fogging and spreading of the image in the emulsion. In addition, there are critical factors that must be accurately met, but can not be listed directly as limiting factors, such as light exposure, uniformity of the emulsion, matching emulsions from negative to positive, printing exposure, development time, etc.

With variable width recordings the limitations are lens dispersion, film image spreading, fogging, emulsion irregularities and width of the recording slit. In fact, with these two systems Kellogg's simile can not be improved upon: "We have given our painter not only too big a brush but a piece of blotting paper upon which to make the picture, and paints that run" (Fig. 3).

With these things in mind we survey the field to see exactly what it is we want in the way of a recorder for a motion picture track, and then check against what is available. First, as has been proved by practice, the sound-track must be upon the same film with the picture. This eliminates from consideration both magnetic and mechanical systems. Now, assuming the same quality among the other methods, I should say choose a variable-width track, because the critical conditions of recording are more easily fulfilled, and it is much safer to transfer photographically from the negative to the positive. This is especially important where dupe negatives are used in the foreign markets. The next thing that is necessary is an immediate playback, and by this I do not mean the playing back of some make-shift record taken on an entirely different recording system, but the immediate playback of the finished record which is to be used for production purposes. Not only can the quality of the picture be improved by due application of this principle, but the cost of production can be reduced also. In order to make this point concrete, mention might be made of two pictures which were released with an interval of time between, in which the same operatic star appeared, the first picture a failure and the second a grand success. Non-technical persons whom I have interviewed have agreed that the sound of the first was bad and that of the second exceptionally good, whereas technical men have told me that the first was good and the second so bad that changes in the reproducing equipment were necessary before the picture could be shown in the theater.

The next step in our survey then brings us to the mechanographic system as the only means of achieving all the desired results described. By means of this method it is possible not only to play back the completed record as soon as it is recorded, but to play the record while it **is being recorded,** with a delay corresponding to four frames of the picture. We are also able by this method to reduce the paint brush to which Kellogg referred to an irreducible minimum and to eliminate the blotting paper.

The first mechanographic machine was built in Berlin in 1891, and consisted of a paper strip coated with a black layer into which was cut a lateral groove, thus removing the black layer within the groove. Upon this groove was cast a strong light, which passed through the paper and through a lens which focused a half-image of the track

Recording for Sound-Tracks*

by
J. A. Miller**

upon a slit, behind which was placed a selenium cell which in turn operated a telephone receiver. Considering the materials available at that time it will be realized that that was a big step, but with present-day knowledge it is easy to see how the physical limitations of the equipment and materials would admit of only the most primitive results. Nothing further seems to have been done with the system until 1930, when Berthon reinvented it, and in conjunction with Nublat, developed a machine that was put upon the European market as a phonograph, and known as the Nublat machine. The later models of this machine, instead of cutting into a black layer, were made to cut through the center of a thin black film, thus making a sound record upon the edge of each half when the film was split. Printing was done with cylindrical optical enlargement in order to increase the amplitude of modulation. The results attained were only fair, as might be expected on account of the severe physical limitations. It will be seen that at a frequency of 6000 cycles and of standard motion picture speed, and with a cutting tool having a heel angle of 45 degrees, it is possible to cut to an amplitude of only 0.002 inch, whereas an amplitude of 0.080 inch is required for motion picture film. At the same time, if it were possible to reach practical amplitudes the power required would be enormous, in fact, several kilowatts would be required to record up to a frequency of 10,000 cycles per second. Although the machine was introduced upon the phonograph market in France, the quality was not good enough for the motion picture field.

It was not until 1931 that the invention was made which now makes it possible to attain with the mechanographic system better results than with any other system. The system now used, known as Millerfilm, makes use of a special film having a coating of clear material upon the base, which in turn, is covered by an extremely thin layer of opaque material, approximately two microns thick. For all ordinary purposes the film is very tough and durable; in fact it can not be scratched by the fingernail. The cutting tool (Fig. 1) is a specially prepared sapphire, the edges of which make a very oblique angle with the surface of the film. Instead of cutting a lateral track as heretofore, the track is hill-and-dale. It will now be observed (Fig. 1) that a very small movement of the cutting tool in the vertical direction produces a great change in the quantity of black layer that is removed. Thus is attained a mechanical amplification of from fifty to one hundred times, comparing the movement of the cutting tool to the variation of the width of track cut. Instead of having to move the cutting tool 0.080 inch for full modulation of the sound-track, it is now possible to attain full modulation with a tool movement of 0.001 or 0.002 inch.

Fig. 2. 6000-cycle recordings: original negatives. (a) photographic sound-track; (b) mechanographic sound track. 100x

Many tests were conducted to determine what material could be applied to a film that would be flexible, transparent, and have the same cutting characteristic as wax. Upon the surface of such a layer must be placed an extremely thin layer of opaque material having a fine grain structure which will cut with a smooth surface, have sufficient strength to withstand damage, and have a definite line of demarcation between the opaque and transparent sections. This was a complete research problem in itself, but film is now available that fulfills all these requirements, and when it is cut, as can be seen in Fig. 2, the line of demarcation is much more definite than can be achieved photographically. The importance of this fact must not be overlooked, as the limitation of all systems depends upon the definiteness of this line of demarcation on an unmodulated track. If the maximum modulation of the track is of 0.080 inch, and the desired range 125 db., then the first 100 db. must be included within modulation peaks not exceeding 0.004 inch high, which does not allow for much irregularity in the line of demarcation. It is possible to obtain film of this sort with the black pigment in colloidal form and of such concentration that grain size is no longer a factor as in the photographic process. The edge to which a sapphire cutter can be ground is microscopic, whence there is no limitation that corresponds to the width of the recording slit, so that frequencies as high as 25,000 cps can be recorded (Fig. 3). Of course, in reproduction, the width of the reproducing beam enters as a detrimental factor, but in this case it is not so important as in recording, and is far better than any needle could be. Irregularities of the emulsion are no longer present, and even the surface of the film where it has been cut is much improved over a plain emulsion surface.

The cutter was the next item of importance, and required a wide departure from current practice inasmuch as it has to be a constant-amplitude device. In order to

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**American Mechanographic Corp., New York, N. Y.

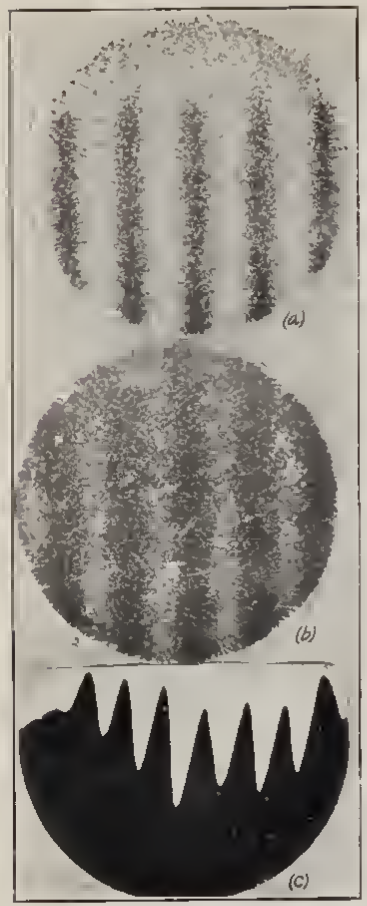

Fig 3 Illustrating the advantage gained in noise-reduction due to irregularities in the transparent portion of the film, and the sharp demarcation in the mechanographic recording. 9A0 SMPE standard tips 6000 cps (b) SMPE standard base 6000 cps (c) mechanographic sound track at point where 7000 cps occurs

gain sufficient movement at high frequencies it is necessary to tune the element to a high audio frequency. A cutter has been produced that will record up to 10,000 cycles per second with a power consumption of about two watts. From this it is easy to understand the impracticability of the old mechanographic system with a lateral groove. The movement of the element would be fifty times greater, whence the requisite power would be in proportion to the square of this figure, or 2500. In addition, the efficiency would be only one-tenth as great, on account of the additional air-gap, which would make the power ratio 25,000 to one. In other words, instead of two watts, the cutter would require about fifty kilowatts. The details of construction of the cutter can not be given at the present time, but the response curve of a typical example can be constructed flat within two db for 30 to 8000 cycles or from 30 to 10,000 as desired.

A study of an original record of the process leads to many interesting observations. More than one track can be recorded upon the same piece of film. Cutting and re-recording can be done from the original. Short ends can be utilized. There is no darkroom loading of magazines. Examination of the track shows that the groove is cut clean, the surface is as smooth as glass, the opaque portions have a density too high to measure, and that the transparency of the clear portion is uniform.

The perfect recording system would encompass about 125 db, but with the present photographic systems the range varies between 35 and 45 db, and with hill-and-dale acetate records from 50 to 55 db. Noise reduction methods reduce the disturbance introduced by irregularities occurring in the transparent part of the track on a dirty film, but have no effect upon limitations caused by irregularities of the materials of the record carrier at the line of demarcation. Eight or ten db are gained in this manner if the film is bad, but any real extension of the range must be accomplished by improving the material of the carrier itself. That this improvement is accomplished by the mechanographic system is clearly seen in Fig. 3, and it should be possible to have a consistent working range approaching 75 db by this method. This can be appreciated better by realizing that if the same degree of perfection of the record carrier is arrived at as is reached with an acetate record of the hill-and-dale type, then the advantage gained is of the order of 50 db, which would indicate a possible range of 100 to 105 db. We assume first that all major imperfections are easily removable and that the ones most difficult to remove are of an order of magnitude of 0.0005 inch or less. In a hill-and-dale mechanical record this irregularity produces 100 per cent modulation at 6000 cycles, whereas on the mechanographic record it would produce a disturbance of 50 db below full modulation on account of the difference between constant-velocity and constant-amplitude recording.

In other words, when the time arrives for sound to be brought up to the standard that is now being demanded by a large part of the public, it will be necessary to re-record mechanographically on each release print. Of course in the meantime photographic copies of mechanographic track can be used, thus obtaining a result that lies between the present photographic method and the direct recorded mechanographic (Fig. 4).

In conclusion, in Fig. 5 is seen a sample of resolution at 50,000 cps, 55 db below maximum that is better than can be achieved by photographic methods at 5000 cps.

Fig. 4. Photographic copies or prints (a) from photographic sound track, (b) from mechanographic sound track, (c) from photographic sound track. 300x

Ray Fernstrom, A.S.C.

Streamlined Cameras For the Air

by
Ray Fernstrom, A.S.C.

IN PHOTOGRAPHING the aerial and Akeley scenes on Universal's "Storm Over the Andes," I was impressed by the problems the near future presents the photographer of such subjects

To begin with we had an airplane that travelled at 230 M P H in level flight that was capable of 275 in dives such as we used in those scenes When an Akeley man has to follow such objects with short focal length lenses he is kept spinning to keep up Of necessity short lenses must be used due to restricted areas, such as canyons with no opportunity to move back for the telephoto shot that such fast pans call for

When it comes to mounting set cameras for background process keys on these faster, ever faster planes, we come to streamlining, as the only solution Now that Howard Hughes has flown his ship at 352 M P H the future air film becomes a most interesting probability for the cinematographer who is trying to prepare for all eventualities

My first experience with really fast ships came last year when the Army received their new streamlined Martin bombers These planes fly along loafing at 250 M P H and my job was to photograph a squadron of eighteen in various formations over clouds and mountains. Of course the only camera ship that could keep up with them was another Martin which the Army made available For the general long shots in the air we arranged the rear cockpit for the Akeley This cockpit in Army usage has a sliding transparent cover over the entire opening Fortunately this cover extends far out over the top edge of the fuselage. By removing the rear and sliding center section a large overhanging "V" shaped windshield remained In practice this served excellently with the Akeley mounted inside the fuselage and as close as possible to the protection of the shield Naturally there was no chance to aim in any direction but backwards and sideways For scenes shooting forward the machine gun cockpit in the nose of the plane, which looks like a scarf ring with a large half of an egg over it and a slit for the machine gun to shoot through, was our scene of action

By mounting the Akeley with its photo lens shooting through this slit and using a Mitchell finder lined up above we had a real streamlined camera blimp, although panning was limited This in part was overcome through the fact that like all scarf rings made for machine guns they can be swung and locked in any desired position Incidentally whenever this housing was swung in the air a terrific wind blast tended to turn the slit all the way backward With optical glass and a larger slit this type of camera mount would be ideal for shots requiring this setup at high speeds Nevertheless, with the exception of Army pictures where such equipment is at the disposal of the aerial cinematographer, the cost of these planes makes them impractical for picture use, generally

After the experiences with "Storm Over the Andes" the writer together with our chief pilot Herb White made a few tests on the fast ships used in the picture, to determine the effects on control of the ships and on cameras, when the two were combined for high speed use

Together with Vance Breese, its builder, we made a flight, after first removing the hatch above the pilot's cockpit At two hundred and ten miles per hour I ventured up and out into the slipstream to see what would happen The pressure was so great it snapped my goggles around my head and the blast almost popped my eyeballs from their sockets I found afterwards that by peeking just over the edge of the windshield but still out of the blast, that no dangerous amount of pressure resulted This taught us that we could design windshields for all cockpit shots where the cinematographer operates his camera on a so-called free head or Akeley tripod, shooting over the sides or through doors Next we found it quite a simple task to cover the camera for set shots atop the fuselage or under it, as described in an earlier issue of "The American Cinematographer" by Charles Marshall, A S C In so doing we designed a cover similar in appearance to the "pants" seen on many streamlined wheels of modern airplanes First we cut out a hole to correspond with the front of the sunshade opening A piece of optical glass fitted into this prevented any air leak into the housing This

(Continued on Page 434)

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The Genuine Never Palls

---Is Dan Clark's Experience

by
Harry Burdick

Dan Clark, A.S.C.

DANIEL B Clork hos probobly poroded more exterior scenes through his comero from lens to negotive thon ony other cinemotogropher now proctiting And by thot very token, though seemingly o poradox, he has won inclusion in the upper brockets of those who possess exceeding obilities ot copturing finest impressions of interior views

Beyond shodow of questian, Clark holds all world records for placing so-termed "westerns" on celluloid No less thon eighty-six of these wide-open sogas hove been done by him He functioned os cinemotogropher for oll of the Tom Mix "hoss operos"

He hos translated so mony of Zone Grey's stories to the screen so mony times with so mony different stors he is one of the oblest outhorities on that writer's renowned works

His comero is o veritoble cotolog of the points of rore scenic beouty throughout the western sector of the notion

Lensing of exterior scenes provides for the ombitious cinemotogropher the broodest ond most extensive grounding in the orts of the orofessian, occording to Clork Here the comero portroitist must odopt himself to prevoiling conditions rother than merely film o set scientificolly designed to fill his needs

After wrestling for o term of yeors with Noture's sets, with oll their noturol imperfections, and with Noture's ever-chonging lighting system, the controlloble factors encountered in photographing man-mode sets with man-mode light simplify to Clark the routine problems of studio photographic production As the result, these studio-mode cinemotogrophic contributions of Clork invoriobly convey on oppealing chorm ond rore wormth of genuine beouty

Clark hod his early troining in o rugged school that stressed the genuine in all things and violently shunned all motters fringing on the ortificiol So thoroughly did he become imbued with this underlying troit of the outdoor dromos that he finds himself corrying the some trueness ond sincerity into his current dromos of more sophisticoted and domestic content

He must, os instance, olwoys hove, or estoblish, on opponent and logicol source of light on studio set just os he olwoys found when utilizing the sun He indulges in few incondescent colisthenics, he cores little for the unreol lighting technic begot of the theotre He odheres closely to the effects he hos observed so mony thousond times outdoors, and simulotes that reolity on his corpentered sets

Hence, he imoorts o definite feeling of believobility to his oudiences His projected scenes live ond octually exist for their brief screened interval He instills the some bosic ingredient of genuineness to the daintiest feminine stor os went into his swoshbucklig heroes of yesteryeor He wonts beyond oll else that his characters oppear reol flesh-ond-blood individuals rother thon figures from o storybook

This ordent devotion to the early teachings he received from Nature's school of lighting has reflection in the outstonding genuineness ond correctness of his current works

An oble instance is his recent "Charlie Chon in Egypt," not perhops o head-lined work but one colling for the exercise of wide cinemotographic talent Here, mointenonce of proper mood governed the film's very success Deviotion from this exoct level of mood would have mode the story wholly unbelievoble and trite Actian colled for views depicting opening of oncient tombs in old Egypt These, of course, were built on the studio premises An archealogist of note designed them A wealth of scientific detoil went into their fobricotion

Then Clark faced the engoging problem of reproducing these exactly-made scenes in monner to convince oudiences they were of centuries-old genuineness

Sunlight, of course, could not penetrote these tombs Yet they must be given photogrophic illuminotion that would be plausible This was accomplished by working in very low key, always with shofts of light emonoting

from definitely established sources In the outdoor tombs this wos gained by previously registering the explorer's work lights When he went to the inner rooms of the tomb, he told his entire narrative by simulated hond seorchlight effects Throughout the sequence he used not more thon two lights ot any time The completed effort corried unconny conviction, by no stretch of one's imagination could the oudience be viewing scenes artificially created Which, in the final onolysis, is truest criterion of cinemotogrophic genius under contemporory production conditions

He is never content merely to lens o series of scenes put before his camero in impersonol foshion He ossumes the broader scope of the true cinematographer—to contribute through the wizardry of his orts oll thot will moke the finished work more reol, more genuine, more believoble—ond hence, better entertoinment

It is significont thot, olmost without exception, when stors view their screened efforts they comment that never before hove they been so obly portroited

Clork hos omply demonstroted his obilities to transmit these longed-for chorocteristics to the screen regordless of locole

"Still" Photography in Natural Colors

(Continued from Page 423)

might be one in which one or both of the remaining primary colors may have been present in our object the color of the printed image, then, must not only be one which completely absorbs red, but which reflects green and blue! It will therefore be a blue-green, or "Minus-red" Similarly, the green-sensation negative will be printed in Minus-green or Magenta, which absorbs green, but reflects red and blue, and the blue-sensation negative in Minus-blue, or Yellow, which absorbs blue, but reflects red and green

Superimposed full strength, these colors absorb all colored light, and produce black Intermediate colors are reproduced by varying proportions of the three primary colors, while a total absence of all color gives us white—the color of the paper base where no ink reaches Thus this time we have achieved our full-colored positive by beginning with the polychromatic light reflected from the white paper, and—by printing with inks corresponding to minus-colors, instead of the actual colors themselves—have subtracted various monochromatic components to produce the various primaries and intermediate shades Such a process is termed SUBTRACTIVE

In addition to trichrome, which will obviously give the most perfect results, the commercial consideration of mechanical simplicity has given impetus to considerable study of two-color processes As has already been mentioned, it is possible to synthetize white light from certain combinations of two colors only Similarly, by a proper selection of the two component colors to be used, it is possible to reproduce a fair range of intermediate colors All of the commercially-used processes of natural-color Cinematography from Kinemacolor up to the recent introduction of three-color Technicolor, were two-color processes If we analyze a typical pair of two-color filters, say the Wratten Cine Green No 40, and Cine Red No 28, we observe the following characteristics Cine Green transmits practically from 480, while Cine Red transmits from 580 to 700 The range in a set of trichrome filters is from 370 to 700, so in two-color processes there is bound to be a certain falling off in the violets and blues, which would affect both the shadows and the reproducible range of colors Precise control of the complementary printing-inks, and a careful selection of the colors in the subject to be reproduced, can to some extent offset this, and lend charm and a certain fidelity to reproductions in this process In theory, the use of dichrotic dyes in printing should permit the reproduction of a color scale very nearly as great as is obtainable in all but the most perfect three-color processes How well this works out in practice can be judged from the remarkable results seen on the screen in recent Cinecolor releases

In two-color still photography, this principle is generally utilized by an adaptation of the bi-pack method familiar to all Cinematographers The front, or blue-record negative is on orthochromatic film embodying a red filter, while the rear, or red-orange record is a regular Panchromatic type A normal print is made from the rear negative upon bromide paper, and toned blue, while the front negative is printed on dichromated gelatin, and given a red-orange tone with a dichrotic dye The tonal range in this image is from an extremely pale yellow-orange in the thin parts, to a pronounced orange-red in the denser portions When this transparency is placed in proper register over the blue print, a two-color print on paper, with a truly remarkable, if limited, range of reproduced color results Such processes usually fail in the correct rendering of blue, violet, magenta and purple, but will give excellent renditions of orange, reds greens, greys and blacks

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Streamlined Cameras for the Air

(Continued from Page 430)

streamlining prevents buckles and a great deal of unnecessary vibration In the past, propeller and wind blasts whipping at tokeun belts have caused many a buckle on cameras using outside magazines, in the air

In regard to wing mounts, the same kind of streamlined cover is essential on the newer speed ships but must of necessity, for control of the ship, be kept as small as possible This means that saddles must be made probably a part of the wing, which is not difficult when such a small camera as the Eymo is made use of

Every day the newspapers tell of new

ochievements in the air Faster commercial airline schedules, trans-Pacific flights, girls setting new records, aerial wor possibilities, Bendix air roces, stratosphere flights, and faster Army ond Navy planes In the oost the news story of one day became the motion picture of the next With faster planes in the news of today it is only reasonable to expect that the air pictures of the near future will insist on modern high speed flying equipment, and camera ships to keep uo with them "Storm Over The Andes" is probably only the first of mony such pictures to came, and when they do, the Aerial Cinemotographer must be ready with streamlined camera ships, mounts and cameras

Summing Up Modern Studio Lighting

(Continued from Page 425)

The condensing-lens types of spotlight ore distinguished by o wider useful ronge of beam-spreads—in general from 8° to 44°—by considerably better beam-distribution, but much lower intensity within the beam The smallest and most frequently used af this line is the 500 Watt "Baby Spot", M-R Type 129, which is generally used with o 500 Watt, T-20 intermediate base pro,ection type Mazda globe, though some cinemotographers at times fit them with standord Photoflood bulbs The housing consists of on integral cost aluminum body, with o hinged ventilating cover above, giving free access to the lomp The lens is o plano-convex type, 5 inches in diometer The lamp is mounted on o U-shaped yoke which moy be mounted on o variety of pedetsols, including thot of the Handilamp ("Lupe") to be mentioned later, or olaced in positions in the set where heavier equipment could not be used

Intermediate in this range is the 1,000 Watt spotlight, M-R Type 36, using o G40-C13 Mazda globe with o 6 inch diameter, 9 inch focus plano-convex lens This is also of integrol cast-aluminum construction, with o C-shaped supporting yoke which permits utilizing almost the whole of the right side for o aoor

Largest of this class is the 2,000 Watt Type 26 spotlight This also is of integral construction, ond uses o G48-C13 Mazda globe with an adjustable spherical mirror ond on 8-in plano-convex Bausch & Lomb lens made of special heat-resistant glass

Rapidly superseding both these types and the 18 inch Sunspat is the newly introduced "Junior Sa'arspot," which cambines the advantages of both types with few, if any, of their disodvantages Built around the 2,000 Watt G48-C13 bi-post Mazda globe (pre-focused), the Solarspat utilizes o spherical mirrar behind the globe in combinotion with o Fresnel-type lens, 10 inches in diameter and of o desirably short focal length, to give o powerful beam of almost ideal distribution at all angles fram 8° to 44° The housing of this lamp consists of o cast aluminum alloy body, with an inner liner of duralumin Due to the large diameter and short focal length of the lens, together with the mirror which reflects the ordinarily wasted rearword rays, the Solarspot utilizes o greater praportion of the light from its globe than does any other type, while the design of the lens minimizes transmission loss and breakage hazards,and affords an evenness of distribution hitherto unattainable It is understood that a larger "Senior Solarspot" will soon be available.

The fundamental carbon-arc spotlighting unit is the 80 Ampere Rotary-carbon arc spotlight, which, like its incandescent prototype, is being supplanted by a more modern lamp of entirely new design. The "80" is of the conventional condensing-lens spotlight type, using a rotary-carbon, high-intensity arc as a source. The carbons, which are motor-fed, are a ½ inch by 12 inch 80 Amp. rotary spot positive, and a 5/16 inch by 9 inch (or ⅜x9) copper-coated negative. The current used is Direct Current only, 73-80 Amperes, 50-55 Volts at the arc.

For purposes where higher intensities are needed, the 24 inch Sun Arc, a reflecting type using a 24 inch diameter glass mirror, is used. This also is a rotary-carbon high intensity arc, using a 16mm x 20 inch high intensity positive carbon and an 11mm x 10 inch plain-cored negative carbon, operated on D. C. at 135-150 Amperes, 68-72 Volts at the arc.

When the highest possible intensity is required, the 36 inch Sun Arc is used. This, too, is a mirror-projector, using the same trim as the 24. One studio also has several special 60 inch Sun Arcs.

The 80 Amaere Rotary is being to a great extent supplanted by a new and more efficient type embodying the optical principles of the (incandescent) Solarspot. Details of this new unit are unfortunately not yet available for publication, but it may be stated that it has much the same beam-distribution as the Solarspot, and has been rated by members of the Technicolor camera staff as being more than equal to a 24 inch Sun Arc. It represents part of an intensive development program undertaken for Technicolor by Mole-Richardson, Inc., and the National Carbon Company, both of whom have contributed basic improvements to the modernization of arc lighting.

Outstanding among the many "special-purpose" lamps is the Hondi-lamp or "Lupe", M-R Type 127. This unit is designed particularly for deft manipulation in close-up photography. It consists of a conical spun aluminum shell holding a chromium-plated metal reflector and a 1,000 Watt T-20 frosted airway-beacon Mazda globe. As the globe can be focused, it is possible to graduate the intensity of the light very precisely from full intensity to a very low level of illumination. The Lupe is available either on a simple elevating pedestal, or on a special extension-arm mount which makes it possible to use the lamp in any position and at any height from the floor level to eight feet.

A Striking Tribute To the Industry

. . . is its ability to take swift advantage of new, improved means and materials of production. For instance: Eastman Super X Pan Negative was announced only a few months ago. Now, aside from many special uses, it is being employed in the bulk of feature productions. The reason? Greater speed, plus generally improved photographic quality. . . You'll want Super X for your next picture, of course

J. E. Brulatour, Inc.

Fort Lee New York Chicago Hollywood

Filmos Give You *Better Projection*

Motion Pictures must be projected without flicker, without jumpiness, with ample brilliance, and with uniform illumination over the entire screen area If not, eye-strain will result . slowly, perhaps not recognized at first, but none the less surely

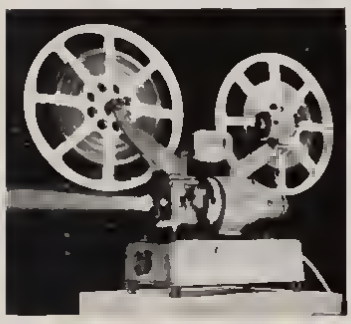
Filmo Projectors are kind to your eyes! Their pictures are flickerless because the Filmo 9 to 1 intermittent ratio is scientifically correct Here Filmos are definitely superior even to theater projectors.

Filmo pictures are rock-steady on the screen because of the microscopic precision of all film handling parts and the perfection of film registration, both vertical and lateral, at the aperture

Filmo Projectors illuminate every part of the screen with practically equal brilliancy Thus they carry through to the screen the full beauty of your photography

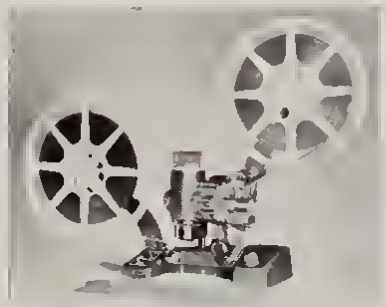
Your films will look better when you show them with a Filmo And they'll last longer, too, for Filmo protects them at every point from surface abrasion and from perforation wear.

There are Filmo 16 mm Projector models for every need Three of them are pictured below



Filmo 130 1000-Watt

Adequate illumination for the largest auditorium 1600-foot film capacity (one-hour showing), 2 inch F 1 65 lens, instantly interchangeable, variable lamp resistance and voltmeter, variable speed governor (16 to 24 , separate motor for take up and fast power rewinding, pilot light, interlocking controls, two way tilt, film conditioner, low center of gravity ,adequate cooling for the 1000-watt lamp.



Filmo 750-Watt

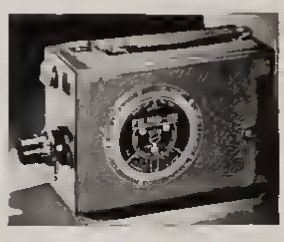
Similar in appearance to the Model 130, but for smaller audiences Low center of gravity, 16 foot film capacity (one hour showing , power rewind two-way tilt, 2-inch F 2 1 lens, instantly interchangeable, pilot light, reverse, still projection The 750-watt lamp may be replaced with a lower powered lamp when less illumination is needed and greater economy is desired Variable resistance and voltmeter are optional

A low cost projector, but with the same basic operating mechanism as Filmo 129. Has 2-inch F 2 1 lens, two-way tilt, power rewind, lamp switch, reverse, still projection, 400-foot film capacity

Filmo 141 Movie Camera

Magazine Loading Feather-weight Easy to Use

Here is movie-making reduced to its simplest terms To load, merely slip a 50-foot film magazine in through the door. Produces beautiful movies in black and white, and is a splendid camera for Kodachrome (movies in color), requiring no special lens or filter. A Taylor-Hobson F 3 5 lens is standard, F 2 8, F 2 5, and telephoto lenses are available Both spyglass and reflecting viewfinders Built-in exposure chart, two film speeds—16 and 24 frames, single-frame exposure button for animated effects. Weighs only 2 pounds 5 ounces, measures only 2¾ x 3⅜ x 5¾ in



Bell & Howell FILMO *Personal Motion Camera & Projectors*

1848 Larchmont Ave , Chicago, New York, Hollywood, London (B & H Co , Ltd) *Established 1907*

25c

AMATEUR MOVIES

this issue

Cinetricks with Mirrors
What is Composition?
Making Added Scenes
Unusual Cine Apparatus
Kodachrome Indoors
. . . and other features

OCTOBER
1935

INDOOR MOVIES WITH OUTDOOR SIMPLICITY

INDOOR movies offer the amateur unlimited opportunity for unusual and dramatic sequences

Provided that his camera is loaded with a film designed for interior work such as Agfa 16mm Fine Grain Superpan Reversible

Superpan is an extremely fast film highly sensitive to all colors including red Its wide latitude minimizes errors in exposure These qualities make Superpan an ideal film for interiors by daylight or by Photofloods

And the extreme fineness of grain means larger screen projection without noticeable grain with greater brilliance depth and detail

Agfa 16mm Fine Grain Superpan Reversible is available in 100 foot rolls at $7 50 and in 50-foot rolls at $4 00 including processing and return postage

OTHER 16 MM. FILMS

Agfa Fina-Grain Planachrome:

100 foot rolls	$4 50
50 foot rolls	2 75

Including processing and return postage

Agfa Panchromatic Reversible:

100-foot rolls	$5 00
50 foot rolls	3 00

Including processing and return postage

Agfa Fine-Grain Panchromatic Negative:

100 foot rolls	$3 50

Developing not included

200 foot and 400 foot rolls (laboratory packing) available

Agfa

MADE BY AGFA ANSCO CORPORATION IN BINGHAMTON, N. Y.

AMATEUR MOVIE SECTION

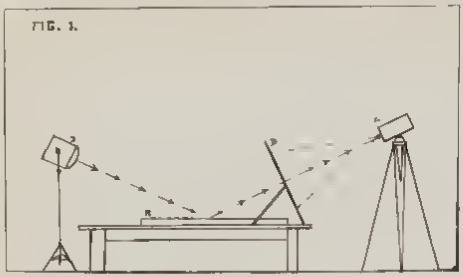
Contents . . .

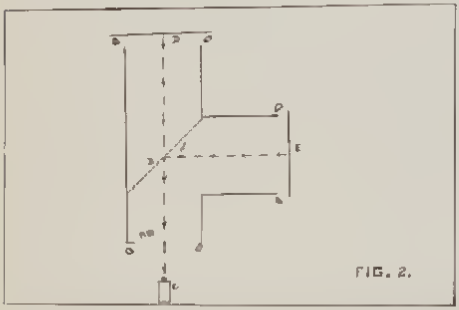
Next Month . . .

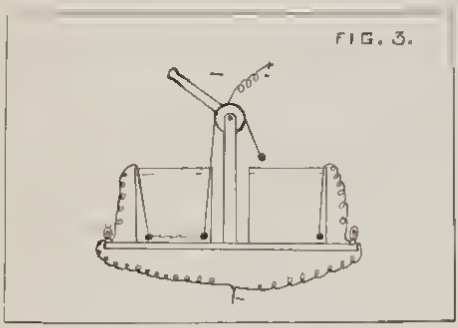
● Several outstanding contributions from A S C members J Belmor Holl, instructor at University of Southern California in the School of Cinematography, will give you more fundamental information about composition Before entering the motion picture field Mr Hall was a prominent artist in the East He was drafted by the industry several years ago to enter their art department and lend his talent to this interesting business

PROFESSIONAL Criticism of the Amateur picture is a part of the service offered by the AMERICAN CINEMATOGRAPHER. Many are not aware of this. Hundreds of pictures have been reviewed this past year by members of the American Society of Cinematographers for the Amateur.

Let's Try







WOULD you like to make lap-dissolves without rewinding—to dissolve backgrounds without changing the foreground—to make 'arty' titles with moving cloud backgrounds, in which the clouds blow into words—to make a single actor play bridge with himself, or even multiply into an army—all at a single 'take', with any 16mm or even 8mm camera?

Don't say such things can't be done They can be—with mirrors!

But before we get too deeply into these tricks, let's clear up the fundamental matter of focus, if we don't, it will surely trip us up later Looking at a mirror, one would naturally figure that the mirror itself was the thing to focus on—but it isn't if we want a sharp picture, we must set our focus for the combined distances from lens to mirror AND from mirror to object For instance, if we want to make a shot of a girl sitting at a dressing-table, showing both the girl and her reflection in the mirror, here's the way to go about it first, shoot from an angle, so that the camera won't be reflected into the picture

Next suppose the girl is say, two feet from the glass, which in turn, is eight feet away from the lens The correct focus will be eight feet plus two feet, or ten feet

One of the simplest mirror tricks is done with two unframed mirrors, set at an angle of about 75 to each other, and with their inner edges touching The subject takes his place between the mirrors with his back to the camera which is carefully screened behind a curtain How many images you get will depend upon the width of the mirrors with wide ones, you can get five different angles on your subject—the direct back view, and reflected profiles and three-quarter front views from either side The vital part of the trick—as in all mirror trickery—is to keep the camera's view confined to the mirrors if you shoot beyond their edges, you simply give away the trick If you can get full-length mirrors, incidentally, you can make very interesting full-figure shots this way

Next comes the trick of multiplying one person or object infinitely by the use of two mirrors parallel to each other You put your subject between the mirrors, and aim the camera toward it, just clearing the edge of the nearer mirror If you line things up properly, you'll get first the direct view of the object itself, just beyond it, the reflection in the farther mirror, next, the re-reflection of the nearer image, followed by the re-reflection of the first image, multiplying and re-multiplying till Gertrude Stein and Einstein couldn't figure it out Naturally, with the size of mirror that most of us have available, miniatures and close-ups are about the limit, but if bigger mirrors are available full-length shots are just as easy to make It is important, of course, to make sure none of your lights reflect directly into the mirrors

The other day, William Stull, A S C told me of a time when, on location several hundred miles from Hollywood, he ruined his last filter just when he had to get a heavily-corrected filter-shot of some clouds Remembering his high-school lessons in polarized light, he made the shot by photographing the reflection of the scene in a black mirror which gave him a black sky against which the clouds stood out beautifully

But here's an even simpler way to get filtered cloud-effects for title-backgrounds You don't even have to have any clouds! Figure 1 shows the set-up You place an ordinary mirror flat on top of a table, and above it slant B, a piece of glass, which carries your lettering The camera is at C, shooting down onto the glass On the other side, at D, is a strong light—preferably a spotlight which is focused on the mirror The space between the camera and the opal glass should be kept as dark as possible On top of the mirror sprinkle a fine layer of sand, brushed thin with a tuft of cotton When you are ready to shoot, blow

Some Cinetricks With Mirrors

by
Jerome H. Ash, A.S.C.

o stream of air over the mirror (o small electric fan will often do nicely! As the sand skitters across the mirror, it blacks out the reflected light, and you get the effect of clouds against o dark sky If you are shooting reversal film, the sand will represent the dark sky, if you are shooting negative (intending to use the negative for your title), the sand will represent the clouds You can also get interesting effects of this type by using iron-filings, which you 'blow' by moving a magnet under the mirror

Now, if you want the clouds to shape themselves into words, use a plain opal glass in the inclined frame, and trace your letters on the mirror with paste or mucilage When you sprinkle on the sand, that that falls on the glue will stay put, while the rest will be free to blow away Making the shot as a negative, you'll have clouds that blow around and finally shape themselves into the title A slight degree af slow-motion often helps this sort of a shot, by the way

This next trick calls for quite a bit of construction—but it is well worth it, for you can do no end of tricks with the device, once you have it made You begin by making a shadow-box as shown in Figure 2 The three openings at "A", "D" and "E" must all be the same size At ' B" you place a sheet of plate-glass in the shadow-box, at an angle of 45° to the camera l"C") and openings "D" and "E" must be the same distance from the glass

In use, you place whatever foreground subject you wish at "A", and two different backgrounds at "D" and ' E" Let's say we begin our shot with background "D" in use the lights illuminating it are on, while those at "E" are off When we want to fade our backgrounds, we dim the lights at "D", and slowly turn those at "E" on The subject, at "A" is constantly illuminated, and moving normally The result is that our scene begins quite normally, with the subject moving against background "D", and—without any change in the foreground action—the background suddenly lap-dissolves into an entirely different view!

The only limiting factor to this trick is the size of the pane of plate-glass "B", which reflects the scene at "E" Made on a small scale, the shadow-box doesn't cost much; and even with a fairly large pane of glass the cost will be reasonably low, for you can make the shadow-box cheaply out of a lath framework and black muslin

The simplest way to lap-dissolve your background-lights is by using a water rheastat, which you can make for a dollar or so You simply fill two gallon crocks with salt water, and hang a piece of insulated wire soldered to a metal weight in each crock These should extend all the way to the bottoms of the crocks, and both are connected to one side of the electrical circuit Next, you make a simple wooden framework above the crocks, with a couple of pulleys, over which you string two other weighted wires, connected to the other side of the circuit These last two electrodes are arranged so that when one drops to the bottom of its crock the other is pulled out of its jar Thus, the current is evenly switched from one circuit to the other, lap-dissolving the lights

If you make this shadow-box set-up on a small scale, you can very easily make all sorts of lap-dissolves to cut into any of your films regardless of when the films were actually shot Simply enlarge one frame of the end of Scene A, and one frame of the beginning of Scene B, and place the enlargements at the two ends of the shadow-box Make your lap-dissolve while rephotographing the enlargements, cut the lap into place between the two scenes—and there you are! Naturally, it will work just as well fading from a title to a scene, or a scene to a title, as it will fading from scene to scene And it will enable you to use the first frame of any scene as a background for a title, with the title fading out, and the scene starting to move

If you make your shadow-box big enough for full-size trick-shots, you can not only fade from one background to another, but you can create ghosts or spirits without resorting to double-exposures In this case, the two backgrounds are identical—and they must be set up very carefully so that both the direct view and the reflected view coincide exactly on the film Now, if you have your "ghost" in one end of the shadow-box, your "dissolve" will simply fade him in, without making the slightest change in either the foreground or the background If you place a piece of furniture at "F", to conceal the ghost, so his image won't grow larger as he comes close to the glass, you can have him walk right out of the reflected scene into the foreground

Parallel mirrors multiplied this miniature galley until Gertrude Stein and Prof Einstein together couldn't figure out which was real and which reflection

What Is Composition In Cinema?

by
J. Belmar Hall, Instructor
Department of Cinema, U S C

COMPOSITION is not the special property of the painter It belongs to all the arts, music, sculpture, architecture, writing, each must have structural form and in that form we have harmony The film is particularly the medium of the combined arts It offers the means of bringing to life the visual point of view, those special qualities of plastic form and conception, design and rhythm

In order to have composition we must understand the principles, and these principles relate to all art forms Line, being the element, must be understood and a glance at the chart on this page will explain fully what relation lines are to good composition

If the camera and the cinematographer use their medium properly the most imaginary and fantastic results can be obtained It is wrong for us to think of technique as anything but applied thought, it is not creative thought When we think of motion, we can go to pictorial production, without any human element and convey a wealth of strange and fundamental meaning Let us take some very simple rhythm, the machine is a good example of abstract motion We need only the necessary imagination, the type of mind that knows what it wants, and is determined to get it The camera is always ready to do our bidding, so we will start The first shot we look for something to lead us into our subject, machines

In front of us is a wheel, turning away from the lens, shoot a few feet of this, cut to wheel directly in front, hold for a moment and then allow the camera to take up the motion with wheel in direction it is going, as we come to bottom turn of wheel cut to a quick shot of anything moving in a vertical direction, we now have the circular and vertical line established Reverse these and you have opposition, by panning we have the horizontal, shoot cog wheels and we get radiation and the closeup of cogs will give us the broken line as each cog comes into the frame If you can wind back to take double exposures you will be able to hold on the screen each of these movements at the same time, thereby creating a greater emotional composition

In this type of film many tricks can come into play. Your imagination can carry this on still further and as the tempos of the speeds of moving machinery pick up the film will have every movement shown in the chart of structural design By bringing a clock into the scene with hands spinning around and freezing it at noon hour all machines stop as a whistle blows This shot can be most effective if you shoot down on whistle and pan it into picture so that it covers entire screen

(Continued on Page 458)

Structural Art in Design

These elements are used in all ART principles found in a complete tangible IDEA.

Line * Form * Color * Notan or Neutral Value * Texture.

VERTICAL: Represents Height, Dignity, Strength, Support.

HORIZONTAL. Represents Repose, Rest, Adds Breadth and Stability.

OBLIQUE: The Contrast to Vertical and Horizontal. Represents Motion, Direction, Action.

SPIRAL OR CIRCULAR: Represents Emotion, Flexibility, Transition of Interest. The broken line is the accent of the above.

I) PROPORTION: Relationship of Dimensions
Space Divisions, Size Relations, Measure Relations, Ratio, Scale.

II) SUBORDINATION: Emphasis, Accent, Dominance, Principality. (Emphasis on center interest. Minor parts are essential to center interest.)

III) RHYTHM: (Formal) Measured Movement, Equality in Arrangement, Beauty, Grace, Order.
(Informal) Flexibility, Fitness, Free Movement.

IV) BALANCE: (Formal) Repose, Symmetrical, Bilateral, Triple, Multiform, Quadrilateral, Restfulness, Equalization, Likeness, Stability.
***(Informal) Asymetrical, Balance of Equal Parts, Subtle Grace.**

V) REPETITION: (A) Sequence, Movement, Progression, Relating to Line or Form, Etc.
(B) Alteration, Orderly Succession, Interchange, Counter Change.
(All over movement or alteration of line or form.)

VI) RADIATION: Divergence, Convergence, Radiation from a Center Point; an Axis; a Base; a Curve.

VII) OPPOSITION. Contrast, Variety, Diversity in Line or Form.
Symmetry, Contrast, Variety in Line or Form.

VIII) TRANSITION: Gradation, Subtle Change, Blending
(Subtle addition to oppositional parts in composition by use of line or form.)

IX) HARMONY: Unity, Oneness, Congruity, Completeness.
***(Elements placed freely but in relation to center line.)**

Save It With "Added Scenes"

by
Walter Blanchard

EVERYONE in Hollywood is familiar with the retort of an early producer to a director who wanted to take his company to Yosemite: "A tree is a tree, and a rock is a rock—shoot it in Griffith Park!" Of course, the producer was thinking only of the expense of transporting a company to Yosemite, but without realizing it, he was expressing very succinctly one of the fundamental truths of film technique. Your Modern, fully conscious of his position among the 'New Intelligentzia', would probably phrase it, "Consecutive scenes need bear no actual or geographical relation to each other in the filming, in the completed work, their filmic relation will be established principally within the subjective mind of the audience, and will synthetize an illusion of actual objective relationship." You can take your pick—the meaning is the same in either case—and it is something that is of practical importance to everyone who makes moving pictures.

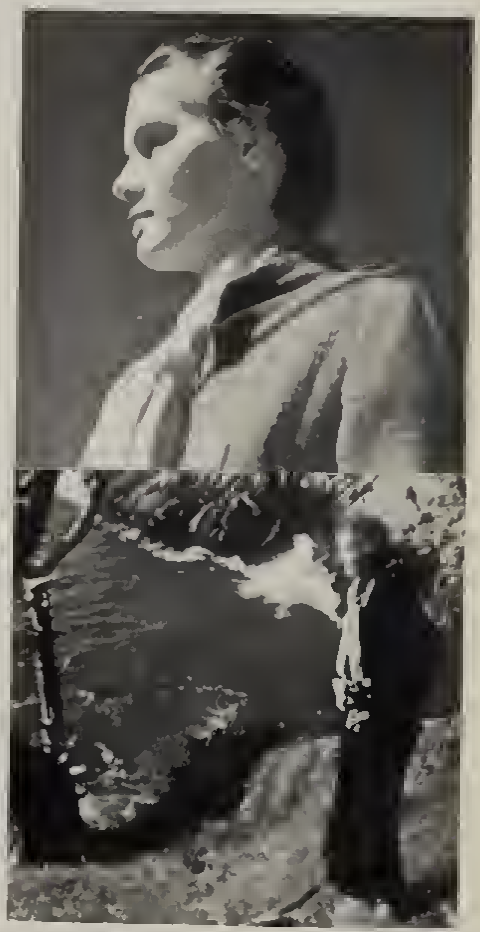
Let's see how it works. What's the main weakness of most amateur pictures? Lack of close-ups to tie the scenic shots together, isn't it? Well, if "a tree is a tree, and a rock is a rock—," it doesn't much matter where we make the close-ups, so long as they **look** as if they belonged with the long-shots!

It works professionally—in the studios—every day. For instance, let's say we want to "get over" the idea that Clark Gable gets into an airplane and flies to Timbuktu. We have a shot of a plane actually landing in Timbuktu, and a long sequence which is supposed to have happened in Timbuktu. We also have Mr. Gable, though we haven't shown that he flew to Timbuktu. To complete the thought, we make a close-up of Gable getting into the cockpit of a plane. Then we make a shot of the plane taking off from the airport. Next to that we splice the shot of the plane actually landing in Timbuktu, and the sequence that is supposed to have happened in Timbuktu. Presto! On the screen, we have incontrovertible evidence that Clark flew to Timbuktu.

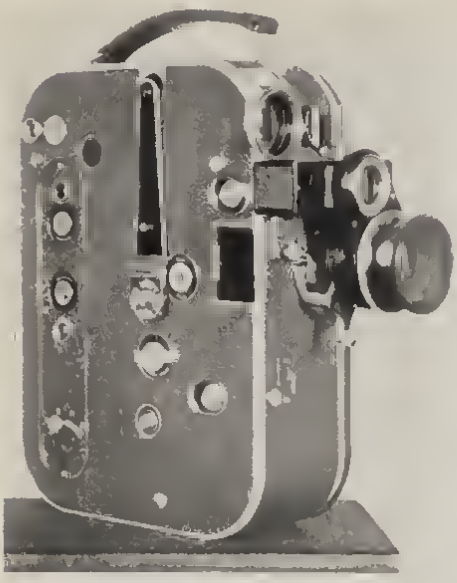
Or suppose we have a picture that was actually made in Abyssinia. It's a pretty good picture, but if some of theint mate, dramatic action were strengthened, it might become a great picture. But we've already spent too much time and money sending our troupe to Abyssinia to permit us even to think of sending them back again just for a few more scenes. So we plan out the action we'll need to complete our picture, and we study the backgrounds of the sequences they'll be cut into. Then we scout around near the studio, and find a bit of country which, in close-ups, at least, can 'double' for Haile Selassie's native heath. We shoot our needed action, cut it into the really Abyssinian sequences—and Solomon himself couldn't tell which was Abyssinia and which was California!

All of this works just as well when 16mm or 8mm film is going through the camera as it does when one is using 35mm. For instance, when I got married, I packed a 16mm camera and plenty of film along with my extra collar and toothbrush. It would be mighty nice, I reasoned, to have a film record of the wedding and the honeymoon to show to my children and grandchildren, but when the

(Continued on Page 454)



Below, scene from picture as shot on trip. Above neutral close-up as shot at home to cut in for better continuity.



The New Zeiss Camera—multiple speeds—normalock—variable shutter—focus thru lens and many semi-professional features

Some Unusual German Substandard Apparatus

Reprinted from Filmtechnik, July, 1935

THERE are certain types of design and mechanical action that are found universally in every type of camera and projector, and this is just as true in the "substandard" field as in the 35mm professional apparatus. The average substandard camera or projector is thus of rather stereotyped design, and few deviations are observed. The German makers of substandard apparatus, though, came rather later into the market than the first (American) manufacturers, and this had its advantages in that the weaknesses of the first models could be obviated by careful design. In the following article a number of special features of the various German substandard cameras and projectors are noted.

The drive in substandard cameras falls normally into the three classes: (1) hand turn, (2) clockwork motor, (3) electric motor attachment at an extra price. In fact, the only camera that does not fall into one of these three classes is the "Amigo-Elektro", made by Gustav Amigo. Although this camera is neither heavier nor more bulky than other substandard machines, it has a small electric motor for drive, and has internal space for four small dry cells of the pocket-lamp type. It is also the only camera that will turn the entire 100 feet of film through without stopping.

Unusual construction is shown by the Siemens camera which is of very original design altogether. It has no sprockets, is extremely simple to load, yet has a device for feeding the unexposed film to the gate, and has a loop-forming mechanism. Inside the charger or cassette the lower (exposed) film roll causes the unexposed top roll to turn forward, so that both rolls of film move together. This camera is also provided with a device to keep the clockwork in the best order possible: the motor may be run down after use without moving on the film.

Devices for making the business of taking pictures more easy are found in several German substandard cameras. The Siemens model D camera may be started and stopped by flexible release. The "Movikon" of Zeiss Ikon goes a step further by arranging that the camera shall have a delayed-action release for the shutter button, which makes self-portraiture an easy matter. This last camera also has an indicating scale in the view-finder that shows how much film the clockwork will still run through the camera without rewinding.

On the whole, however, most of the deviations of the German substandard camera designs from the usual are connected with the lens itself. Direct focusing on the film—an action that every 35mm camera must possess, or it is called inefficient—was first introduced by a German maker. The Niza cameras focus direct on the film, for instance, and the new "Movikan" of Zeiss Ikon is also arranged to provide the same facility. It must, of course, be remembered that the finest device for direct focusing on the film is of no avail when the film itself is opaque. Although there are a number of reversal films that are opaque, others are not, and the negative substandard film is usually also clear. The positive grade of stock is also clear. For many purposes, such as trickwork and titles, very close work on small objects, and other similar subjects the direct focusing on the film cannot even be substituted by the "reflex" focusing devices, since the latter cannot be used while the camera is running.

Focusing by scale is rendered unnecessary by the special design of the "Movikon". This is the first—and up to the present time, the only—substandard camera which has a built-in distance meter coupled to the focusing mount of the lens. There is also a device that compensates for parallax error between finder and the focusing mount of the lens, so that both focus and camera field can be extremely accurately determined without the slightest trouble.

Other original designs relating to the lens may be seen in the various Siemens models. The B and C models in this range are the only cameras having automatic coupling between the iris diaphragm and the speed control, so that when the camera speed is altered the lens aperture is automatically corrected to the proper value, and mistakes in exposure cannot result. The model D Siemens camera is not fitted with this device, since it has a battery of lenses. The model D, however, has a very useful point about it: the three lenses are arranged on a vertical slide,

(Continued on Page 457)

Reversible Film for Miniature Camera

by
Nina Morgan

Production Still by Victor Haveman of Columbia Studios Leica Agfa Superpan Reversible Film. 8x10 Negative made by Morgan Camera Shop.

ORIGINALLY introduced for studio work, the new Agfa Reversible 35mm film is finding great favor among miniature camera users In the studios this film has been successfully used for background projection work due to the grainless positive it produces A reversible film will give a positive of less grain and with finer definition than the negative-positive printing, because the reversible film is not printed through as is the negative. The method is the same as with all reversible films The negative is shot in the camera in the same way as the Agfa Superpan negative which the Reversible approximates in speed In processing the negative is developed, bleached, exposed to light and redeveloped, finishing up as a positive It then can be projected for inspection of the shots If a positive film for projection purposes only is required, the Agfa Reversible film fills this need without the necessity of bothering with the printing of a positive film from one's negative However, the above is only one of the many uses for this film

This type of film should prove of distinct advantage in the selection of locations for the studios Photos of locations to be considered may be taken on reversible film with miniature cameras and viewed at the studio by director and cameraman as projected by a still projector such as the Leitz Udimo In this way a still photograph is seen on the screen just as a motion picture audience would see the moving picture Planning of camera angles, and filter effects could be done also in this way and viewed upon a screen The same procedure could be carried out by amateur motion picture cameramen who desire more perfect final effects

Victor Haveman and Paul Ivano have made test production stills with the Agfa Reversible used in their Leica cameras Beautiful grainless enlargements have been made from these stills The method is as follows: after the reversible film has been processed, a large 5x7 or 8x10 negative is made by direct enlargement of the positive on Agfa Commercial film with an enlarger which takes 35mm size negatives, such as a Leica enlarger The negative should be developed in a soft-working, fine-grain developer Contact production prints or enlargements can now be made

The above method has tremendous possibilities for amateur workers Many Leica users have wished for a practical and easily manipulated way of retouching the small negatives Often only one or two shots from the whole roll of film satisfy the requirements of the more advanced pictorial or portrait workers Through the use of Agfa Reversible film in their Leicas, these photographers can now make larger negatives from the chosen positives They may now retouch or block out upon a large negative after enjoying the advantage of shooting many, many arrangements of their subject matter at a low negative cost

In portrait work Agfa Reversible film should find a wide popularity Many portrait photographers prefer to use miniature cameras Others use them for special purposes, such as for photos of children, when they need to take many poses and when film cost is an important factor Through the use of a positive film, the portrait photographer may project the pictures for his clients, thus giving

Continued on Page 456

Flat front lightings are best for Kodachrome, with back or side light put in only after you are sure of plenty of front-light for a good exposure.

When Kodachrome Comes Indoors

by
Walter Blanchard

WHEN you start shooting Kodachrome indoors, you'll find a world of new experiences waiting for you. The color possibilities of interior scenes are endless and so are the problems of capturing them. Getting really good color interiors is far harder than getting good black-and-white ones—but the result on the screen is infinitely more satisfying.

Right at the start, I'd better warn you of two things. First, unless you have fast lenses and plenty of lights, you are going to find yourself limited to fairly close shots. Second, once you get started playing around with color-film and lights, you've contracted an incurable disease. Nothing will make you happy but more color-film and more lights.

Nearly every kind of film used today is quite a bit less sensitive to artificial light than it is to daylight. Some films are a good deal less than half as fast under Photofloods as under old Sol. Kodachrome, in this respect, behaves like any other film. The Westan exposure-meter people recommend a meter-setting of 6 for outdoor exposures with Kodachrome but they advise setting the meter at 2 when Kodachroming under Mazda or Photoflood light. With the older meters this means setting the indicator three notches beyond (that is, to the left) 4, which is the lowest point on the dial.

Part of this is due to differences in sensitivity and to differences in the actual intensity of natural and artificial light but in Kodachrome you must also compensate for the blue "Photoflood" filter. The action of this filter is to cut out some of the excess red and orange rays of the lamps, which, if we shot without the filter, would make our picture very red indeed. Since the filter simply stops part of the light, without putting anything in its place, we naturally have to increase the exposure to compensate for the filter.

The Weston engineers have also suggested a very different way of taking meter-readings when making Kodachrome scenes by artificial light. Instead of merely holding the meter up beside the camera, they advise holding it within ten inches of whatever part of the subject is of the greatest interest—the face, for instance, in close-ups. Take your reading with the meter in this position, being sure that the meter itself doesn't cast a shadow, which would affect its reading.

But, how much light or we to use, how many lamps? And how should they be arranged?

The most truthful answer to the first question would be simply, "as many as possible." The Eastman experts sum it up this way:

Normal Speed. (16 per sec.)

Number of Photo-flood lamps and distance from lamps to subject	f:1.9	f:2.8	f:3.5
	2 at 3½ ft	2 at 2¼ ft	
	3 at 4¼ ft	3 at 3 ft	3 at 2 ft
	4 at 5 ft	4 at 3½ ft	4 at 2¼ ft.

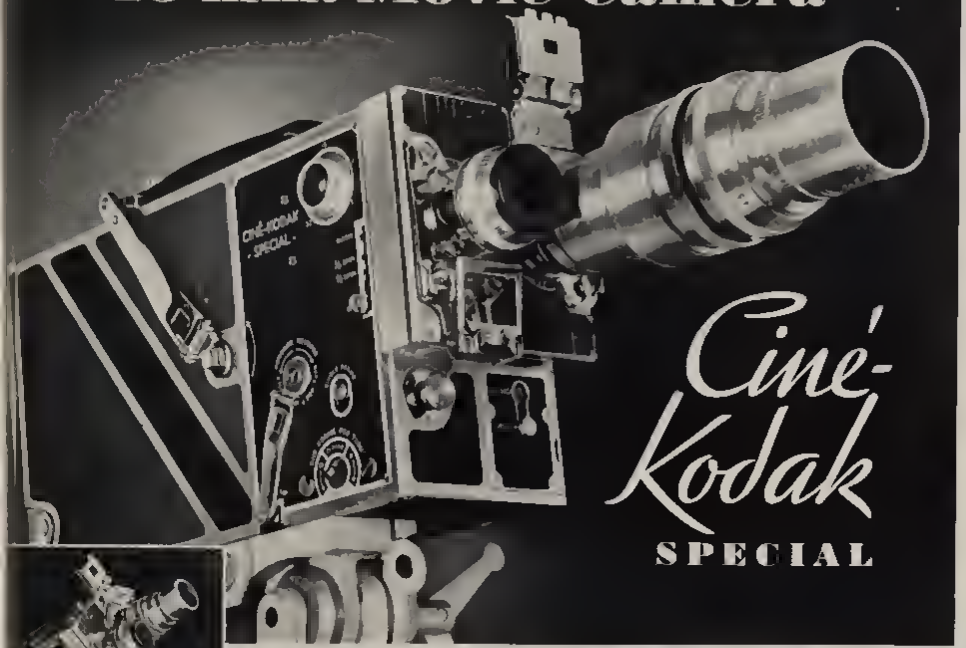
Half Speed. (8 per/sec.)

Number of Photo-flood lamps and distance from lamps to subject	f:1.9	f:2.8	f:3.5
	2 at 5 ft	2 at 3½ ft	2 at 2¼ ft.
	3 at 6 ft	3 at 4½ ft	3 at 3 ft
	4 at 7½ ft	4 at 5 ft	4 at 3½ ft

Experience in shooting Kodachrome outdoors should already have given a hint as to what type of lighting is best for color. Almost always, the best results will follow the use of a plain, flat front-light. This is doubly so when shooting interiors, for our artificial suns haven't nearly the strength of the natural one, and we must therefore "double up" if we are to avoid underexposing. Under such conditions, if we follow the rules of lighting for black-and-white, having one side of the face lit twice as strongly as the other, we would be very likely to lose the shadowed side of the face entirely, for shadows, in color, go very dark. So we go back to the most elementary lightings—flat and even, with the lamps as close to the center-line as possible without getting them into the picture, and with

(Continued on Page 452)

The World's Most Versatile 16 mm. Movie Camera



Ciné-Kodak SPECIAL

Variable Shutter—*For fingertip command of fades, lap dissolves, and other "trick" effects. Also for additional exposure control*

Reflex Finder—*Shows on a ground glass the exact focus and field, at any distance, with any of the seven lenses available for the Special*

Your Ingenuity Alone Limits the Use of This Outstanding Camera

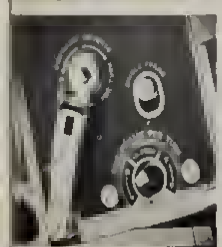
CINÉ-KODAK SPECIAL does "everything." Fades, double exposures, dissolves, slow motion, masked pictures, speeded action, animation—all these cinematic "tricks," and more, are quickly and handily carried out with the basic model of the "Special."

And an unusual line of accessories further widens its scope. Among them are numbered an Electric Motor Drive for exposure throughout the unusually wide speed range of from one to sixty-four frames per second; a Lens Extension Tube Outfit for extreme magnification of minute objects without the assistance of microscopes; an Optical Finder which can be calibrated for all focal length lenses from 15 mm. wide angle to 6-inch telephoto. This finder is provided with parallax correction down to 2 feet—therefore the correct field of all lenses can be indicated at all distances.

Truly this superfine camera dominates the field of 16 mm. movie making!

The basic model is equipped with Kodak Anastigmat *f*.1.9 lens, 100-foot film chamber and set of six masks. Estimates for adaptation to any specialized work will be made upon request.

EASTMAN KODAK COMPANY, *Rochester, N. Y.*

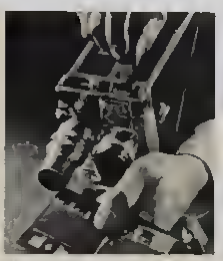


Hand Cranking Shafts—*Besides its spring motor drive the "Special" may be hand cranked by right- or one-frame shafts*

Film Chambers—*100- or 200-foot film chambers enable you to change from one type of film to another without rethreading.*

Send for this FREE Booklet

A more detailed description of this remarkable camera is available upon request. Write for "Presenting Ciné-Kodak Special," a generously sized, copiously illustrated booklet. Address Eastman Kodak Co., Rochester, N. Y.

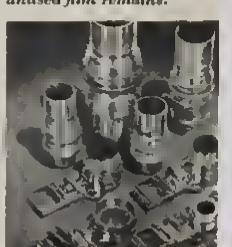


Set of Masks—*Circle, oval, two vertical, and two horizontal half-masks are supplied with the basic model of the "Special." Other designs available.*

Double Lens Turret—*Facilitates instant change from a lens of short focal length to a telephoto. Exposure guide under each lens socket.*

Single Frame Release—*This feature, essential for successful animation, permits the exposure of a single frame every time the release is pressed.*

Film Meters—*One meter registers the amount of film run or wound back. Another, on each film chamber, shows how much unused film remains.*



Accessory Lenses—15 mm. *f* 2.7 wide-angle, 20 mm. *f* 3.5, 2-inch *f* 3.5, and 3-inch, 4½-inch, and 6-inch *f*.4.5 telephoto.

WHEELS OF INDUSTRY

Slow-Motion Checks Rough Riding

● How smoothness of riding for passengers of super-fast trains, of the streamline and other modern types, has been impraved as the result of studies made by slow-motion pictures is an interesting story of American business and its use of scientific methods

About a year ago, the Chicago, North Shore & Milwaukee Railroad, the high-speed electric line running between Chicago and Milwaukee, decided to conduct an investigation of truck oscillation or 'nosing" — a transportation factor which, because of its contributing to uncomfortable riding, has become increasingly objectionable on all railroads as speed has been increased

A slow-motion 16mm Bell & Howell motion picture camera was mounted in a box on a bracket on one corner of a truck which was guilty of nosing Solenoid control started the camera after the car had reached a speed above 60 miles an hour, when noticeable nosing commences The camera was focused on the lower part of the wheel where it contacts the rail, and pictures were taken of a worn wheel as found in service and then of a new replacement wheel When the films were projected both the worn and the new wheel were seen to oscillate with a regular and continuous motion The only difference noticeable in the movies of the two wheels was the less violent action of the new wheel due to the fact that this wheel had less clearance between flange and rail than did the worn one This led to the belief that the oscillation was caused by the taper of 1 inch in 20 which has been a part of the standard design for railroad wheels

On this belief, a set of wheels was turned without any taper but with the flange kept the same shape and size as formerly Slow-motion pictures taken of these wheels showed no regular oscillation at all, in fact, the flange seldom impinged upon the rail on a straight track The riding of the car was greatly improved, as there was no more nosing The test car was put into regular service and watched as to wear of wheels and riding quality The wheels wore with some taper due to the rails being worn that way by the standard wheels, but slow-motion pictures taken after 30,000 miles showed only a slight tendency toward oscillation This car is still in service and is being carefully watched, but the results of the test have been so conclusive that all new wheels and those re-turned are of the new type without a taper

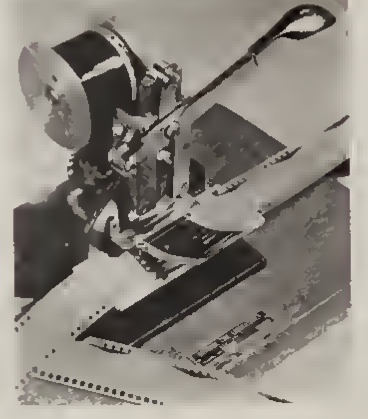
Says a Chicago, North Shore & Milwaukee Railroad official "A number of railroad men from other lines have viewed the slow-motion pictures and have applied the principle to their equipment, especially in the case of the new streamlined trains, and greatly improved riding has resulted"

Burleigh Brooks Lenses

● The firm of Jos Schneider & Company, lens manufacturers of Germany, represented in the United States by Burleigh Brooks, lately introduced several new photographic objectives, namely the Aero-Xenar, the Ortho-Angulon, and the Componor

Aero-Xenor—As its name indicates, this is a six-element lens of the Xenar type with certain properties which render it the ideal objective for aerial photography Spherical distortion and chromatic aberration have in this lens been brought down to an irreducible minimum Aberrations inherent in the oblique rays have likewise been corrected, resulting in an anastigmatically flattened field over a comparatively wide angle The aperture of the Aero-Xenar is f 4 5 and it focal lengths are 10", 11¾", and 19¾"

Ortho-Angulon—A wide-angle, special, objective, particularly intended for photogrametric work, that is, land survey, the making of relief maps, etc It combines in unusually high degree corrections for spherical aberration and astigmatism, and is the last word in an apochramatic lens, thoroughly corrected for the complete gamut of spectral colors It defines the subject sharply and without the slightest trace of linear distortion to the extreme edge of its angular field Its aperture is f 4 5



Componar—These f 3 5 and f 4 5 lenses are special flat field enlarging objectives for the amateur and professional photographer They are well corrected for spherical aberration, color, coma, and astigmatism They come in several sizes and are adapted for use with instruments with or without enlargers

National Sound Splicer

● The National Cine Laboratories have perfected a splicer for the sound track on 35mm film that automatically cuts, places and cements an opaque patch across the sound track at the point of splice The frequency of this patch at 90 feet per minute is said to be approximately 16 cycles and is therefore claimed to be inaudible It is claimed this device eliminates the need of painting patches The device is illustrated on this page

University Uses Annual

● Doctor Boris Morkovich, head of the School of Cinematography at the University of Southern California, has adopted the Cinematographic Annual volume I as one of his text books

Doctor Morkovich is using this volume because of its essential fundamental information, because of the authoritative nature in which it is presented and because it is the only work of its kind in existence covering some phases of cinematography not covered in any other work

This is the book which was recently reduced in price from $5 00 to $2 50

Bell & Howell Releases

● Bell & Howell Company announces the release by its 16mm Filmosound Rental Library of "Thunder Over Mexico," 7-reel feature talking picture produced by Sergei Eisenstein, noted Russian director The University of Wisconsin has made arrangements for a long-term rental of

Continued on Page 458

A Few of the Many

REASONS WHY

ANIMATOPHONE

is the most widely used of all 16MM SOUND PROJECTORS

Portable—simple to set up—easy to operate. QUALITY of SOUND and PICTURE comparable to that of finest professional showings

Film lasts longer in the Animatophone. Victor's patented safety clutch prevents film breaks and other film damages—lower film costs. (Not available in any other equipment at any price!)

This, however, is only *one* of several important advantages that only Animatophone embodies.

Picture size up to 12 feet wide, at any distance to 125 feet—controlled sound volume to correspond. Small room to banquet hall capacity.

The Animatophone is a time-tried performer It has been adopted as standard equipment by a majority of Present Industrial, Educational, Religious, and Individual users of 16mm Sound Equipment.

Nation wide service. All-inclusive guarantee.

Ask for Literature and DEMONSTRATIONS

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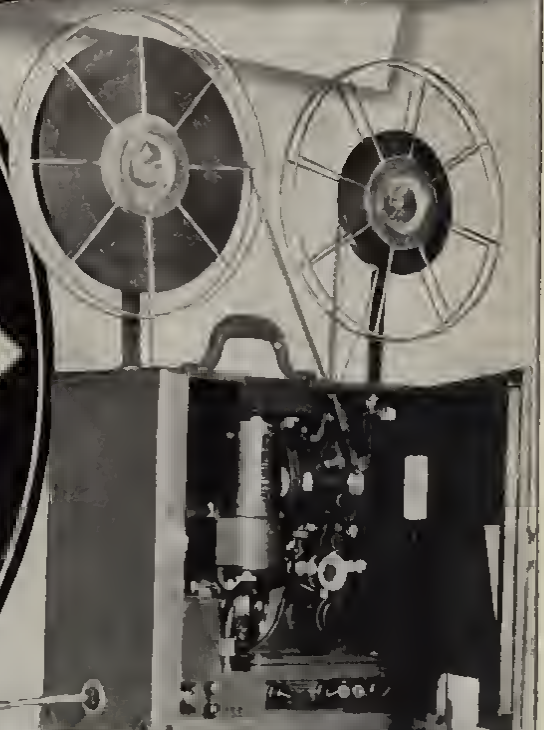

World's Finest 16MM MOTION PICTURE *Equipment*

When Kodachrome Comes Indoors

(Continued from Page 448)

the same number of lights, if possible, on each side of the camera.

At this point, the fellow who has done some black-and-white portraiture begins to think, "Well, I can spare a little here and there for modelling, can't I?" Not a chance—unless you have half-a-dozen or more lamps! Put them all on the one job of illuminating the subject's face, pumping them in one on top of the other, carefully checking to see that the 'hot spot' (or brightest part of the beam) from each light is right on the subject's face, and that all the beams are superimposed.

Once you've gotten that far and your meter assures you that you've built up enough illumination for an exposure, then—and only then—can you begin to think about the rest of the scene.

The first thing, if you have any lights to spare, is to try to get some back-lighting. Back-light has to be intense—rather stronger than the front light, if it is to be effective—so your back-lighting lamp must be close to the subject. A spotlight, of course, is the perfect lamp for this. If you have one, use it, with the beam 'pulled down' as tight as you can get it. If you haven't a spotlight, press a reading lamp into service, slipping a Photoflood into its socket and putting it above, and slightly behind the subject. The same, of course, holds good for side-lighting. Once you know you have enough illumination to get a good exposure, and have arranged a nice back-light, you can, if you have any lamps left, use some of them to provide a side-lighting, letting the regular front-light take care of the shadows. In other words, follow the example of the professional Cinematographer, who first lays down a foundation of general light which assures his exposure, and builds up from that level to the high lights that give roundness and sparkle.

With all this light concentrated upon the person being photographed, what are we going to do about the background?

Well, the background will have to take care of itself, unless we have as many lamps as a Hollywood studio. Logically, we can 'cheat' a bit, by placing our subject close to the background—that is, to a wall, a tapestry, a bookcase, or the like. If we do this, the 'spilled light' which is, so to speak, left over from lighting the player, will show up some of the background. If we can slip a Photoflood or two into wall-fixtures, bridge-lamps, and so on, they will help a lot, though they can't be as

Amateur
MOVIE MAKERS CONTEST
Closes November 30th

ONLY A FEW DAYS LEFT
Here are the Rules---Read Them

The Contest is open only to Amateurs No professional cinematographer will be eligible to compete

The Contest ends at midnight of November 30th, 1935 All pictures must be received by the closing date or they will not be considered

Pictures Submitted in this contest will be judged for photography, composition, direction, acting, editing and entertainment value The judges will include outstanding and widely known cameramen, directors, actors, writers and a group of nationally known motion picture critics

The Decision of the judges will be absolutely final and there can be no appeal from their decision Announcements of the awards will be made as soon after the close of the contest as possible and checks and prizes will be sent the winners

Pictures may be submitted either by individual amateur cine filmers, or they may be submitted by amateur movie clubs They must be photographed on 16mm or 8mm film Each entrant must have his entry accompanied by the entry blank which will be sent him on request to fill out No pictures will be accepted which were photographed on 35mm film and then reduced.

Contestants may enter as many subjects as they desire One entry blank will cover all subjects placed in the contest by that entrant.

The Contest is open to amateurs and amateur clubs anywhere in the world

The American Cinematographer reserves the right not to declare a prize for any classification, if in the opinion of the judges there is not a picture submitted sufficiently good to be classed as a prize-winner

The American Cinematographer also retains the right to make duplicates of such prize-winning pictures as it may indicate for free distribution to clubs and amateur organizations throughout the world

If you intend to enter the contest send at once for entry blank to

Contest Editor

American Cinematographer

6331 Hollywood Blvd. Hollywood, Calif.

efficient as they would be in proper photographic reflectors

Another way we can help the lighting is by selecting light-colored backgrounds They will naturally show up better, for dark walls lap up light the way a cat laps up milk

It's rather a question whether, in color close-ups, dark, unobtrusive backgrounds aren't more desirable, as they tend to make the subject stand out more brilliantly One of my best Kodachrome shots was a head-and-shoulders close-up of a girl in a blue dress, against the background of a brown sarong, the background was all but lost in soft, mysterious shadows, and was revealed only occasionally when some of my side-lighting strayed over to outline the folds in the draped sarong

Likewise, it's a good thing to make the colors of the victim's costume help your shot darker clothes will naturally eat up light, and be less brilliant than lighter shades, and greens, which are the weak point of any subtractive color-process, should be avoided wherever possible

Lastly, let old Sol help you out with your lighting! Shooting color-interiors in a sunny room, with the natural light 'boosted', if necessary, by your photo-flood units, will give you still another field of interesting activity—and beautiful pictures, to boot

Save It With Added Scenes

(Continued from Page 445)

film came back from the processing-station, it seemed to be a good deal more landscape than honeymoon and though the landscapes were nice ones, still, they didn't afford much of an indication that my wife and I had been bride-and-grooming it in the vicinity So I bought another hundred feet of film, and selected a handy bit of hillside that could double for some of those shown in the landscape long-shots My wife and I put on the same clothes we wore in the few scenes we'd appeared in, and set forth to make our 'added scenes' Here, I made a close-up of her, with a bit of bare hillside in the background—there, another, framed under a pine branch—again, she took the camera, and shot me (against a non-committal background) busily plying my still-camera, then, we set the camera on its tripod, and got several good close shots of the two of us together, wearing properly beatific expressions A few days later, I finished the roll with some shots of myself—always against diplomatically unobtrusive backgrounds —putting suitcases into and out of the car, brushing rice from my hat-band, and so on The results were just what the picture needed to provide a complete record of the honeymoon loading the baggage into the car—the church, the wedding party—a long-shot of the car on the highway—the actual landscapes, introduced by close shots in which we admired the view, or made stills of it, or merely beamed ecstatically at one another—unloading the car—that shot we made of the hotel—and so on down to the finish and my bit of business with the rice And no one who has seen the picture so far has even guessed the trick by which we achieved the completeness they've so admired!

One of my friends, who lives in an inland city, salvaged the films of a trip to Hawaii by the same method He couldn't duplicate the tropical foliage of Honolulu in his home city—so he chose his angles in such a way as to provide a background of sky and clouds for every added close-up Choosing his weather carefully, he planted his people on hilltops, where he could shoot up at them without having to use unnatural angles Waikiki beach scenes, for instance, were made in this manner, with the aid of a bathing-suit and a bucket of water dashed over the victim just be-

fore the camera started, a night-effect shot made on the boat was matched by an interior scene made against a flat, dark curtain, illuminated by a spotlight reflected from a panful of water, which gave rippling reflections across the faces!

It is often possible to "double" people, too. Suppose you made a trip to Europe, and met some interesting person. You got some good shots of him—but you neglected to get any of yourself with him; and to prove to the folks back home that you actually hobnobbed with a 'highness', you ought to have at least one shot of the two of you together. Well, there are two sides to everything—even to a "highness." You have a shot of his face (front elevation, as the engineer says)! If you cut next to this shot one of yourself, with a back, clad similarly to the royal personage's, in the foreground, and let the action suggest that you were snapped during an animated conversation, your audience will leap to the conclusion that the two shots were made at the same time. All you will have to do will be to get someone of approximately the right size and build to stand in the foreground, wearing clothes that resemble those the other shot shows draped around the distinguished figure, and—always this!—shoot the scene against a properly vague background. If your "added scene" is made well, and the cutting done expertly, you are bound to get the desired effect. Incidentally, the idea will work quite as well to suggest the schoolteacher from Keokuk you met on the boat!

On the other hand, another of my friends works on exactly the opposite plan. He concentrates on getting the actual, intimate close shots of the people he meets during his travels. He shoots these in great profusion—and lets the scenic shots, as a rule, take second place. In most places, he reasons, he can buy commercial films of such scenic views, made, as a rule, rather better, and under more ideal conditions, than he could photograph them himself. but he can't buy close-ups of his fellow voyagers. So he shoots the scenes he can't buy, and buys those he can obtain commercially. When the two are intercut skillfully, he has a genuinely complete record of his trip in all its phases—made more easily and cheaply than could be done by any other method.

After all, the beauty of motion picture-making is the fact the audience can judge what it sees on the screen only by what has gone before and what comes after. Neither time nor space exists for the cine-camera. the only limiting factors are the skill and ingenuity of the man behind the camera!

Clubs Show Prize Pictures

The Medford Amateur Movie Club is scheduling a special meeting for the showing of the American Cinematographer 1934 Amateur Movie Prize Winning pictures.

The pictures included in this showing are two 16mm subjects and two 8mm pictures. The 16mm subjects are "Water," made by H. Demorest of New Jersey, and "Mischief," made by Va-Dee Sickler of Los Angeles. The 8mm subjects include the grand prize winner "New Horizon," made by R. B. Clordy of Los Angeles, and the photographic winner, "Tender Friendship," made by Totuschi Okamota of Japan.

During the month of October the well known Metropolitan Club of New York City will schedule a special program for the showing of these same pictures.

During the past year about 30 clubs have made these pictures a feature part of their meetings.

Reversible Film for Miniature Camera

(Continued from Page 447)

them a better conception of each picture as it will be enlarged, and saving him the time and cost of making so many proofs

Many photographers like to work with paper negatives. Time saving and more perfect negatives will be the result of using the new reversible film, as the paper negative can be made by direct enlargement of the positive image. Alterations may now be made upon the paper negative as upon film. Paper negative prints are popular because of the interesting textures which may be accomplished by this method. Contact papers may be used for printing, offering a variety of choice.

The making of photomural's is a new field which is just beginning to achieve universal notice and popularity. Photomurals lend themselves to home and office decoration and have many possibilities for the exhibition of industrial processes. More and more Leica photographers are becoming interested in photomurals. Through the use of reversible film and large negatives made from it, they should be confident of success. Nevertheless, there is an enlargement of about three and one-half by five feet made by direct enlargement from an Agfa Finopan negative shot with a Leica camera. The use of the reversible film, however, would give one the choice of retouching if necessary.

As time passes miniature camera users will probably find dozens of other uses for this new film. In any case several of the present problems of miniature photography may find solution through the use of reversible film. Reversible film has became the accepted thing for 8 and 16mm amateur movies. In the wide field of miniature camera work it will probably became standard procedure for certain special uses.

Formula for Reversing AGFA Superpan Reversible Film

1 **First Developer.**

Solution A

Water (125° F. or 52° C.) (750.0 cc)	24 oz.
Methol (2.0 grams)	29 gr.
Hydroquinone (15.0 grams)	219 gr.
Sodium Sulphite (desiccated) (20.0 grams)	292 gr.
Sodium Bisulphite (5.0 grams)	73 gr.
Sodium Thiosulphite (Hypo) (5.0 grams)	73 gr.
Formaldehyde (40%) (5.0 cc.)	1¼ fl. dr.
Water (cold) to make (900.0 cc.)	28 fl. oz.

Solution B

COLD Water (100.0 cc.)	4 oz.
Sodium Hydroxide (Caustic) (25.0 grams)	365 gr.

Pour Solution B into Solution A while stirring. Depending on exposure develop 4 to 6 minutes at 65° F. or 18° C.

2 Wash 5 minutes in running water.

3 **Reversing Bath** (Bleach)

Water (1000.0 cc.)	32 oz.
Potassium Bichromate (5.0 grams)	73 gr.
Sulphuric Acid (concentrated) (5.0 cc.)	1¼ fl. drams

Normal bleaching time 3-6 minutes. Keep in bleaching bath until negative image is completely dissolved.

4 Wash 5 minutes in running water.

5 **Clearing Bath.**

Water (1000.0 cc.)	32 oz.
Sodium Sulphite, dry (50.0 grams)	1-2/3 oz.

Clear for 5 minutes.

6 Wash 5 minutes in running water.

7 Expose to Mazda light or diffused daylight.

8 **Second Developer.**

Water at 125° F. or 52° C. (1000.0 cc.)	32 oz.
Metol (5.0 grams)	73 gr.
Hydroquinone (6.0 grams)	88 gr.
Sodium Sulphite, desiccated (40.0 grams)	1-1/3 oz.
Potassium Carbonate (40.0 grams)	1-1/3 oz.
Potassium Bromide (6.0 grams)	88 gr.

Develop 5 minutes at 65° F. or 18° C.

9 Short rinse in running water.

10 **Fixing Bath.**

Same Fixing Bath may be used as for other Leica Films. If one is not available the following may be prepared.

Water (1 liter)	32 oz.
Hypo (300.0 grams)	10 oz.
Potassium Metabisulphite (50.0 grams)	1-2/3 oz.

(Sodium Bisulphite may be used instead of Pot. Metobisulphite weight for weight. It's cheaper and just as effective.)

Fix for 2 minutes.

11 Wash for 30 minutes in running water.

12 **Glycerine Bath.**

Glycerine C P (1 liter)	2/3 oz
Glycerine C P (20 0 cc)	2/3 oz

Leove in glycerine both for 5 minutes

13 Remove excess water with Viscose Sponge or chamois and dry in a current of warm dry air

NOTE Operotions 7-13 take ploce in ordinary white light Superpon Reversible Film should be desensitized before development by immersion in a 1 5000 solution of Pinacryptol Green Desensitizer Sofelight Filter to be used for protection of Agfa Reversible Superpon with a 10-watt bulb Agfo No 103 (Token from LEICA MANUAL—Morgan & Lester, p 127)

Some Unusual German Substandard Apparatus

(Continued from Page 446)

which makes them very quickly changeable, ond while in other cameros the finder must be altered to compensote for the difference in focol length, in the Siemens D the finder is outomatically changed to give the right field of view This is arranged by o mechonical coupling between the three finder lenses ond the lens slide

Just in the some way os with the comeros, substondord film projectors have tended to become steretoyped in design Some German designers, however, have gone their own way, and turned out some interesting and useful apparotus

Most substandard projectors, for instonce, follow camero design in moving on the film by claw oction But the first Germon substandard projector thot came on the market, mode by Geyer-Werke, used the stondord maltese cross oction The system of using maltese cross and drum oction wos perfectly sound, even though lock of experience of substondord films wos rother evident in the construction of this mochine Among the modern Germon substondord projectors, though, the portoble projector of Bouer uses the moltese cross ond drum, the Gigont projector of the Union - Tonfilmmoschinenbau - und - Vertriebsgesellschoft m b H hos o modified moltese cross oction, ond manufocturers in other countries ore olso beginning to consider the use of the same device The lotest Litox models ("Piccolo" ond "Suoer-P") hove o sprocket oction for moving on the film, while the Siemens projectors hove on ingenious dog oction thot does not touch the sprocket-holes, but pulls down the film by pressure on the outer edges This gives o short pull down ond o remorkobly steody oicture, combined with o commendoble obsence of weor on the film Devices for protecting the projector agoinst improper hondling ore olso found on mony Germon mochines The Siemens projector was the first to include automatic coupling between the resistonce ond the projection lomp, but the oction hos since been incorporoted in the mochines of o number of other mokers The Siemens projector only lets the lomp be turned on when the resistonce is fully in circuit This projector olso has o mechonicol link between film gate, speed regulator, ond reversing switch, so that when the film is moved bockward through the machine, the gate opens outomaticolly to releose the drog on the film, and the speed of running is automatically increased

The recent increose in light flux from substondord orojectors wos first sponsored by the German makers The Siemens machine does this by alterations to the optical system of the lamp, and by the special lorge-aperture projection lens The new Union-"Gigant" model is the first to use o mirror-backed lamp, which throws the filament image on to the film gote, and to incoroorote o drum shutter that cuts off the light bath in front of and behind the projection lens

Alteration of the shutter from two to three blades is quite a common feoture of German substondord projectors This possibility of chonging the shutter blades makes it eosy to odoot the projector to the particular use that is made of it The Siemens projector introduced the system of interchongeable shutter blodes thot could be oltered without special tools or expert knowledge while such mochines os the "Argus" mode by Liesegong ond the Lytax and "Movector" of Agfo, hove shutters that moy be chonged from two-bloded to three-bloded or one-bloded to two-bloded respectively merely by pressing o button ond moving the blodes over eoch other The Agfo-"Movector" olso hos o shutter speed of twice normol, so thot four dork periods per picture ore obtoined

Two interesting mechonicol novelties moy be mentioned in conclusion The fight between the vorious substondard film sizes hos led to the Nizo firm designing their projectors so thot the projection heod is interchangeable, ond moy be hod for four different film sizes

Secondly, advertising films, which ore ordinorily used with continuous projectors, need no longer be mode up in loop formotion The Siemens stondord projector con be supplied fitted with o device which runs the film through, rewinds it, ond projects it once more The oction goes on until the current is switched off

What Is Composition in Cinema?

(Continued from Page 444)

Another type of film that hos greot possibilities is the "Frozen Action" Just try taking octian shats and freezing them at the dynamic movement. You will be surprised how humorous ond unusuol they will appear The sequences should be related actions and for camedy you can resart to slow motion just os the action is ready to "freeze"

Next month I hope to take each "structurol farm" and break it down into its relotion to the camero Study this ond you will be surprised how simple it is to fit it to your motion picture script

Wheels of Industry

(Continued from Page 450)

the film, Northwestern University opened its summer school motion picture oppreciotion progrom with this same subject, ond orrongements were immediately completed for distribution in Great Britoin

Additianol current releoses by this progressive 16mm sound film rental library include a 2-reel adventure picture "N'Mongo," on educotianal picture of notive life in Centrol Africo, centering around the efforts of a master hunter to capture the rorest of Africon portridges, the Frankalin All the preparations for the peculiar hunt are pictured in detail, ond the picture os o whale gives on interesting insight into native life, such as is generolly lacking in the "tourist" type of film

"The Masked Roider" (2 reels), o children's picture, ond of interest to all lavers of the out-of-doors, is anather worthwhile releose, os is "South Seos" (1 reel), on odditional chopter from Zone Grey's Scropboak

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New Leica Manual

●The descriptive line under the title of this book on its credit page says "A Monual for the Amoteur ond Professionol covering the entire field of Leico Photography" The outhors, Willard D Morgan ond Henry M Lester, might have gone one step further and said in oddition to Leica Photogrophy "all photography"

To benefit fram this comprehensive volume one doesn't necessarily hove to be solely o Leica user If you shoot ony type of camero the information it will give you will be opplicable in 75% of the cases

The book hos more thon 500 pages and sells for $4 00 Morgon and Lester, the outhors, ore also the publishers

In addition to the two authors there are 20 other outstanding contributors of orticles ond special photographic subjects

The book is divided into three ports Port one is given over to Technique, Port two the Leica in Science and Educotian and Part three the Leica in Specialized Fields This lotter field has some very interesting chopters thot will appeol to everyone, such os Condid Photography, Stoge Photography, Hollywood Studios, Aerial Photography, Photography in the Tropics ond Photomurals with the Leica

When we say that it takes up Panoramo Photogrophy, Stereoscopic Photagraphy ond illustrates the methad to secure this type of photogrophy in oddition to o lucid word description, it can readily be understood that this is nat a book to be picked up, skipped through ond then put oside It will be referred to constantly for its comman-sense instructions, its comprehensive dark-room information and the many things it offers for thase who wont to get a full measure of en oyment aut of photogrophy

Victor Moves

●Victor Animatograph Corp has moved their Los Angeles offices from the down town sectar to 2402 W 7th St, which is obout o mile ond o half outside of the shopping center, making parking facilities much better for the dealer coming into Los Angeles

The quorters selected by Carl Rolke, manoger of the Los Angeles offices, are more commadious ond on the store floor. The orrangements not only give a commodious disploy room, o repair depart ment, but olso o projection room

Amateur Movie Contest

The annual American Cinematographer Amateur Movie Contest will close this year on November 30. That is, all entries must be in our office on that date.

As usual the members of the American Society of Cinematographers will act as judges.

There will be four outstanding prizes. None worth less than $150.00.

THE GRAND PRIZE will be	$250 cash
EASTMAN KODAK CO. offers	$150 in Equipment
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It isn't too late to start your picture now if you haven't already done so. It can be in as many reels as you wish, it can be either 16mm or 8mm. Write for more information and Entry Blank.

CONTEST EDITOR
AMERICAN CINEMATOGRAPHER

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